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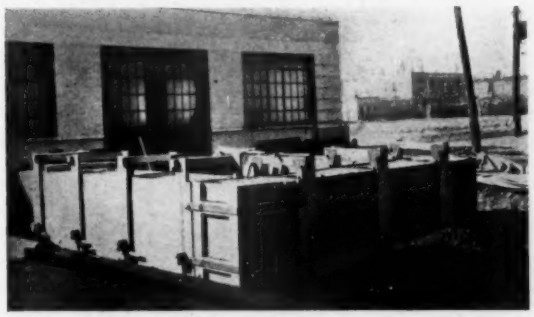
A Side Trip in Building

By THOMAS CRANE YOUNG

IN view of the fact that economic conditions have for the present combined to block all manner of construction, any proposed addition to the list of building material which may become generally available should receive thoughtful consideration. No known material is more equably distributed by nature over the surface of the globe than common earth, but few people now believe that in its crude state it can be made of practicable use for building purposes. Modern science has ignored the subject and the modern house builder has made no use of it



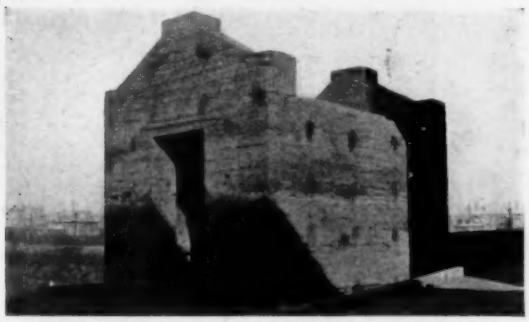
First Course—Shows form in place and filled with tamped earth
EARTH HOUSE, ST. LOUIS, MO.
THOMAS CRANE YOUNG, *ARCHITECT*

whatever, perhaps because manufactured products have been easy to get and cheap. Earth building is a forgotten art, yet history tells of its use, extending far back into the early centuries of civilization. In our day, war has forced back again into modern life many of the conditions and cruder customs usual only in a more primitive social state, and so perhaps a revival of this ancient practice may prove of use in solving some of our new and pressing housing problems.

Our country contains (mostly in the western states) many picturesque examples of earth building, or "adobe," made from puddled clay and straw, moulded into blocks and dried in the sun; these blocks are then laid in the wall like ordinary masonry. Usually "adobe" walls are covered by a protective coat of plaster, although frequently they may be seen standing and useful without covering of any kind.

About one year ago an article appeared in an English illustrated journal called *"The Sphere,"* which contained a description of "Pise' de Terre" masonry and claimed that substantial walls could be built by simply ramming nearly dry earth between two forms made of boards. These forms were described as of standard size, about ten feet long and three feet wide, and when tamped full, the forms could then be moved along horizontally and another section of wall laid in the same manner. Other courses could be laid by placing the same form on top of that part of the wall already built, and the process continued.

Since the publication of an article on earth walls



Shows completed walls ready for roof and finishing coat of plaster
EARTH HOUSE, ST. LOUIS, MO.
THOMAS CRANE YOUNG, *ARCHITECT*

in the *Literary Digest* some months ago, very many letters have been received expressing interest in the subject and for the most part earnestly requesting further information. One writer from Foochow, China, is, however, entirely skeptical as to the value of earth for building. He states that "mud" hovels are common in many parts of China, but they are uniformly insanitary and insecure when subject to heavy rains or floods. In this he is no doubt quite

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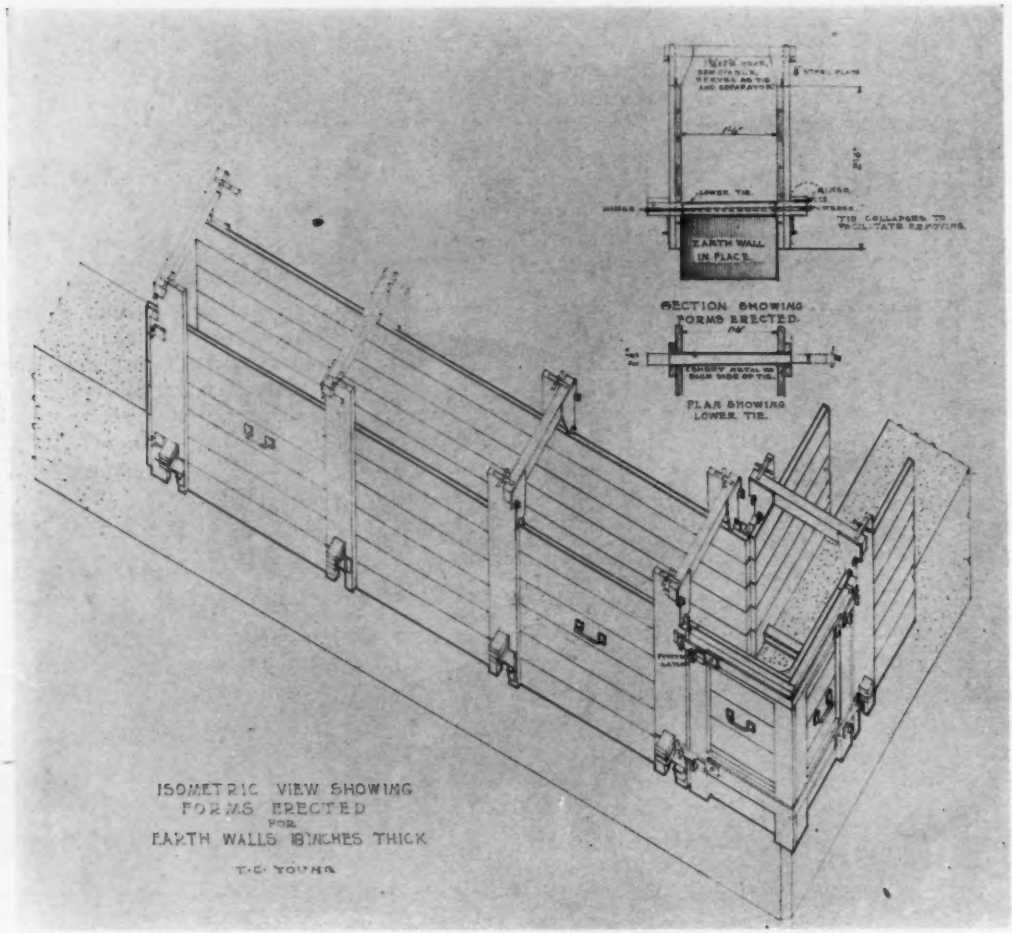
correct, but our material is not "mud," and it must be remembered that similar conditions exist frequently when more expensive materials are used. Another, calling himself an "agricultural missionary," writing from Portuguese South Africa, says that if a practicable way of building with earth could be found, it would solve one of their most serious problems. Similar letters have come from Canada, Mexico and

used in testing cement. These specimens developed a tensile strength of from 80 lbs. to 125 lbs. per sq. inch after six days' seasoning in the form. A test for compression developed a strength of 125 lbs. per square inch. Later on, a small "cube" of earth used in the little building illustrated, failed under compression at 473 lbs. per square inch after forty-two hours' seasoning.


EARTH WALL IN PLACE
SECTION SHOWING FORMS ERECTED.
PLAN SHOWING LOWER TIE.
ISOMETRIC VIEW SHOWING FORMS ERECTED FOR EARTH WALLS 18 INCHES THICK
T. C. YOUNG

EARTH HOUSE, ST. LOUIS, MO.
THOMAS CRANE YOUNG, *ARCHITECT*

many parts of the United States, all tending to show a very general desire for simpler and less costly methods of building than those commonly in use.

However, it seemed highly improbable that earth could be compacted by hand sufficiently to stand in a wall until the result of a few experiments had been obtained, made with dry earth tamped into "briquette" form, and tested in the manner customarily

Of course, these few tests are of no scientific value, but may serve, perhaps, to indicate the desirability of a more thorough investigation of the physical properties of compressed earth by qualified experts.

But if such walls as these had been successfully used at one time they could be in another, and the evidence seemed to justify the making of an experi-

ment in actual construction at the first opportunity. Fortunately, there was little difficulty in persuading the superintendent of the David Rankin, Jr., School of Mechanical Trades to permit the attempt to erect with earth masonry a small building for the storage of oil and gasoline on the school premises. While this building was to be only ten feet by thirteen feet in plan, it must be roofed and provided with a door and window and so would possess most of the elements of a larger house.

This experiment has convinced the author that earth may be used successfully for the walls of small dwellings, for farm buildings, for fences and garden walls or similar purposes—possibly for army cantonments. But the application of this or any new system of construction to actual use will no doubt entail considerable preliminary study of building processes and may require some slight modification of the usual forms of architectural details.

There are many advantages that would follow a more general use of earth construction, not the least of which would be a diminution in our enormous annual waste by fire and a supplementary saving in the consumption of new lumber—the country's supply of which, we are told, is becoming rapidly depleted. Besides, there would be no waste like that in concrete construction, for the same wooden forms or boxing can be used for an indefinite time on any building.

Earth walls, besides being fireproof, afford a very efficient protection against extremes of temperature and there may be opportunity for the inventor in devising an equally cheap and effective construction for floors and roof.

One of our most serious problems is that of transportation, which constitutes a large factor in the cost of building. Some of this expense is, of course, unavoidable, because certain manufactured products, such as iron pipe, plumbing fixtures, glass etc., must be used in any case. But with earth already on the premises substituted for other manufactured materials used in walls, a large part of the transportation charges would be eliminated.

The possibility of improved artistry in earth building seems unlimited. The thicker walls permit an effect of stability now absent in most of our house designs, particularly of the cheaper sort, and a knowing use of color on the plaster covering might give distinction to a simple building at little cost. The use of plastic decoration with color added suggests the possibility of an architectural development which might become distinctively American.

While there may exist at present prejudice against the use of earth as a material fit only for the dwellings of the very poor, it seems possible that further study by architects and engineers might develop a system of building altogether satisfactory from the standpoint of cost, construction, sanitation and aesthetics.

The writer feels that a single attempt at earth building has not furnished sufficient data for the preparation of a real specification, but perhaps a few hints derived also from such literature as was available may be useful to any one wishing to undertake a similar experiment.

While in this case a foundation of concrete extending about 8 inches above the surface of the ground was used, it is probable that an earth foundation would answer as well if thoroughly protected by a waterproof coating.

Front view showing finished building
EARTH HOUSE, ST. LOUIS, MO.
THOMAS CRANE YOUNG, *ARCHITECT*

The earth used in building the walls was obtained by grading the site and from the foundation trenches. The best results were obtained with a mixture of stiff yellow clay and top soil in the proportion approximately of one part clay to two parts loam.

The earth should be free from roots, twigs or vegetable substances and should contain no lumps of clay or gravel larger than will pass through a 1¼ inch mesh screen. In tamping the gables, we used earth sifted through a ¼ inch mesh screen, and obtained a smoother wall. When placed in the form the earth should be only slightly damp, and until used it should be protected from rain by a shed, tarpaulin or other means; it should be placed in the forms in thin layers not more than 4 inches thick, pressed down with the feet and rammed until solid with a wooden rammer, and so on until the boxing is filled. The end of each section of wall should be tamped to a slope which will form the joint with the next one added horizontally; joints in successive courses should not fall over those in the lower course. Great force is not needed in tamping; a quick, sharp stroke

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is the more effective. Strokes should not be in unison. Wood blocks may be placed in the boxing and tamped into the earth to serve as grounds for attachment of frames, wainscoting, etc. If the top of one course is dry when a second course is laid it should be slightly sprinkled with water to insure adhesion.

Fig. I shows the form or boxing used, placed on the wall, ready for filling. The lower ties are first placed at the proper distances on the wall, then the side pieces are lifted on and the top yoke quickly pressed into place. The steel plates on the yoke are slotted and "halved" with the iron lugs screwed to side pieces and hold the top of the form rigidly in place. A block screwed to the top of the tie holds the lower part of the boxing on one side, and a similar block on the other end of the tie is hinged in order to prevent obstruction on extracting the tie from the wall. For the same purpose the tie is tapered and made in two parts, wedged apart at one end. On removing the wedge the parts come together sufficiently to permit easier passage of the tie through the hole. No doubt this device may be improved. Taking out the ties is the only difficult part of the whole process. When the wall is completed the holes may easily be filled with dry earth tamped in with a hammer or mallet, a little water being first sprinkled around the edges of the hole. Small defects arising from accident may be repaired in the same way.

No doubt with a suitable apparatus and more experienced labor much greater speed in building may be accomplished than in this case. It took two laborers eleven working days to lay 460 cubic feet of earth, or the equivalent of 10,000 brick, and by applying the local price of each type of labor, one may form his own conclusions as to the comparative cost.

It is almost useless at this time to attempt to make accurate estimates, but it seems probable that earth walls, plastered, can be built at from 50 per cent. to 65 per cent. less than common brick walls without plaster.

In this little building the author has experimented with various forms of waterproofing; with coal tar products applied directly to the exterior surface of the earth; with paint and with waterproofing material in the finishing coat of plaster; but time will be required to determine the necessity of using any of these substances, or of their relative usefulness. The author believes that with improved apparatus and more experienced labor a very smooth surface for earth walls may be obtained and that scientific study may develop some means of hardening the earth so that a plaster coat would be superfluous even for decorative purposes.

Minneapolis Architects Have a "Colony"

MINNEAPOLIS architects now boast of a "colony" of their own. A spacious building of Florentine design, located at Second avenue S. and Twefth street, was recently thrown open to the public.

"The exterior follows the Florentine style because it lends itself peculiarly well to varied window arrangements," Edwin H. Hewitt, architect stated. "It is built of Indiana Bedford stone, has a frontage of 65 feet on Twelfth street and 110 feet on Second avenue, and is four stories high. The elevator well terminates in a tower in the upper story, and above the machinery is an artist's studio. Even the chimney carries out the design."

One of the unusual phases, according to Mr. Hewitt's plan, is that while each firm will maintain its individual practice, many things will be used in common, such as the library, sample rooms, stenographers' room, blueprinting and specification printing.

The third and fourth stories are especially designed for offices, library, sample room, clients' room, consultation rooms, blueprinting room, contractors' consultation and reference room, stenographers' room, a fireproof vault for permanent records and valuable plans, and large drafting rooms that are subdivided by glass partitions, making them private for each firm, yet easily accessible to others, when consultation or suggestions are desired.

These two floors will house a group of professional men. A special addition on the first floor, and a large part of the basement, will be occupied by professional clubs, such as the Attic club, the Minnesota Chapter of the American Institute of Architects, the Post and Lintel club and the Skylight club. The basement also will contain a model kitchen and tea room, where meals will be served at noon to occupants of the building and their friends.

One of the rooms in the basement will be for the exclusive use of draftsmen who desire to study at night. A professor from the University of Minnesota will be available as instructor in design and the studies will be in the nature of university extension work.

At one side of the building, away from Twelfth street, is a large lot that is to be terraced and developed into gardens in the spring. A colonnaded veranda opens on this space from the first floor.

Two School Buildings in Syracuse N. Y.

JAMES A. RANDALL, *Architect*

(See plate form for illustrations)

Delaware School

A TWO-STORY and basement fireproof, brick school, having an anaemic department on the roof—containing an assembly-hall, gymnasium, public library and stack-room, bank, 17 class rooms, 2 industrial class rooms. Industrial manual training, school manual training, draughting and blue printing rooms, lumber storage and finishing rooms, school cooking, domestic science, dining room, millinery and sewing room, model flat of four rooms, swimming pool, shower rooms, boys' and girls' locker rooms, boys' and girls' toilet rooms, kindergarten, principal's office, reception room, medical and dental clinics, teachers' rest room, reference library, anaemic department containing two class rooms, clinic dining room, serving pantry, store room and covered porch; store rooms, electrical room, boiler room, fan room, coal bunkers.

The school will accommodate 1,000 pupils.

It was built during 1915-16-17-18 and opened in September, 1918.

It cost completely furnished $343,270.

Mr. James A. Randall was the architect for this structure as well as for the Blodgett Vocational School here described. Illustrations of these buildings will be found in the plate form of this issue.

Blodgett Vocational High School

A THREE-STORY and basement, brick fireproof building containing an auditorium, library, mail office and two private offices, teachers' rest room, two ante-rooms, two dressing rooms, superintendent's office, 8 class rooms, 4 drawing rooms; 14 store, stack and locker rooms; 3 tool rooms, 6 janitor's closets, kitchen, lunch room, faculty lunch room, two physics, chemistry and biology laboratories, physics and chemistry lecture rooms, boiler demonstration, forge foundry, steam fitting and metal working, demonstration, printing, emergency, elementary and advanced machine shops, pattern making, wood turning, elementary and advanced cabinet making, wood working machinery, finishing, dry kiln, lumber storage, lecture, blue printing and dark rooms, two apparatus rooms, dressmaking, millinery, commercial bookkeeping, typewriting, stenography, applied design, laundry, domestic science kitchen, model flat of 5 rooms, motion picture booth, fan rooms, transformers, electrical, electrical generator, boiler room and coal pockets.

Built during 1916-17-18, this structure cost, completely furnished, $545,000. There are 1,300 pupils accommodated, and thirteen toilets for faculty and students.

Experiments in Art-Teaching in the Schools

THE extremely practical side of the arts was ably emphasized by School Superintendent Corson, of Newark, N. J., in speaking of the approval recently given by the Board of Education to his plan for the extension of the system of intensive teaching of the manual arts throughout the entire school system.

"Art," said Dr. Corson, "is of value to all manufacturing interests. France owes her preeminence as an industrial nation to the fact that she combines beauty and utility in all her products. The high prices these products command in the markets of the world are due primarily to the element of beauty. It would be a mere venture to say how much is paid for beauty and how much for utility, but the ratio is certainly more than half and may be as much as five to three.

"The American schools cannot afford to ignore a principle so clearly seen," Dr. Corson stated. "The schools must educate all to an appreciation of beauty as an element in manufactured goods of all kinds, and must not only develop a body of consumers, but must lay the foundations for training a body of workers for the factories of the country."

Teaching with such a purpose was scarcely possible under the old system. The action taken by the committee in approving his recommendation is of very great importance. It establishes a new epoch for the teaching of art, of domestic science, of domestic art and of manual training in the schools.

"It has been customary to teach these subjects without much relation to each other," he continued. "Each had its own field, and each was given approximately one hour of time a week. It is not difficult for any one to understand that this was merely playing with these important subjects, or, to put it differently, it was teaching subjects with very substantial educational value in a dilettante manner."

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While Dr. Corson felt that considerable gain was made in the manual arts when they were more closely related he felt that the problem of getting the whole value of these subjects had not yet been solved. As he put it, "there was still difficulty in the way of realizing to the full the possibilities in these several subjects. A reasonable time was not available to teach them, for the program of studies was full to overflowing and the demand for time could not be met without a radical adjustment of the schedule."

Having arrived at this viewpoint, Dr. Corson decided to make another move and requested four schools to try out a new schedule devoting a period a day for five weeks, alternating them with other subjects in five-week cycles. The theory was the pupils would make such great gain that the loss in intervening cycles would be comparatively small. In one school it was worked out so successfully that educators from other cities have come to see the plan in operation and the results to be shown.

Another reason for satisfaction in the new move expressed by Dr. Corson was the direct reaction on the pupils. He said:

"In all these subjects there is the element of doing. To make something that is at once useful and beautiful appeals strongly to every one. It calls into activity the ability of the pupil. The purpose of an academic education is largely to train and to prepare for the future, but these motor subjects have an immediate purpose to accomplish. There is immediate use for the principles learned and the making of things gives the pupils a sense of accomplishment and of joy that adults have in doing things that are worth while.

"The time is long past when these subjects can be called fads. It is remarkable that in a great working nation like the United States such rich subjects are decried. That such has been done is due to the strength of tradition and to the aristocratic notion that education was a process of class selection and it was best accomplished by studying the useless or the ornamental merely.

"Chinese education until recently was an extreme example of this kind of an education. It is my belief that the schools of today should train for living in a modern world."

Unwise Building Laws—Written and Unwritten*

By GROSVENOR ATTERBURY

THE housing problem is above all the construction problem and the construction problem is the elimination of waste. And one of the causes of building waste is arbitrary and unintelligent regulation—which is what I am asked to discuss.

Now unwise laws are *taxes,* and fall like rain on the just as well as on the unjust. And the unjust fellow is the one who usually gets the umbrella! The incidence of building codes like the incidence of taxes is apt to work injustice. It is the honest builder and the innocent public who pay the Jerry Builders penalties.

So one is tempted to say that all building laws are unwise. But of course that is not quite true. In so far as they are teaching codes and not taxing codes they are beneficial. And if we could be sure of honest and skilled administration our building codes could consist of just two words—"anything safe."

But since unfortunately we cannot yet write our building laws on this basis, we must content ourselves with certain obvious improvements in the existing system. As far as possible our codes should be standardized throughout the country. "Factors of safety" should be reduced to the basis of honest construction. And in the last analysis, to lower our "Factors of Safety" we must raise our standard of morals.

"One-two-four concrete" should not have to compete against "One-five-ten-twenty Concrete." The $20 ingredient should be eliminated. This means honest, well-paid inspectors.

Superintendents of construction should be licensed —like drug clerks—and held responsible. The burden of protecting against fraudulent construction should be transferred from the Building Departments maintained at the cost of the taxpayer, to the building—at the cost of the dishonest constructor.

We should have special sections in our codes governing the little house—the laboring man's house. Generic laws are sure to pinch some there and the smallest house deserves the greatest consideration. In the aggregate it represents the greatest investment, quite aside from its paramount importance in welfare of the community.

But besides the written building law, there are certain unwritten laws that actually control building operations today, and I am going to take the privilege of extending the content of my subject so as to include these invisible codes; for the simple reason, that in my judgment they much more vitally affect the cost of the working man's home than the written laws.

**Speech Before the National Housing Association's Conference, Bridgeport, Conn.*

The written laws consist of the building and housing codes and the insurance regulations, while the unwritten law is based on the rules of the labor union, the trade agreements of the materials producers, distributors and contractors and certain "Unholy Alliances" between them all.

In the last analysis our troubles are not so much in our building code as in our code of morals. Too many of our buildings are laid up in graft instead of honest old fashioned mortar!

It is the same kind of malady that has caused a good deal of our present business depression. I was talking with a banker the other day and he said the same thing apropos of America's foreign trade: That South American merchants would buy goods from American agents on sample and then get goods that were nothing like what they bought. He said the only trade mark in the world that was 100 per cent. good was the English trade mark. We are losing our foreign trade, and we will never recapture it until we are honest in our trademarks and deliveries.

That is a very unfortunate thing to have to say of your own country, but I am afraid it is true. And it runs through many of our industries, and much of our construction work, and the point of incidence where it hurts and pinches as much as anywhere else is in the workman's own housing!

The unwritten laws in my judgment are the most sinister and the greatest surtax on the small house. The big fellow can afford to pay those taxes perhaps, but the little man cannot.

Let us make a guess, for example, at the price which the little fellow, usually the working man himself, is liable to pay for all those factors of dishonesty and waste—we might call them "Surtaxes." They might be roughly but conservatively apportioned as follows:

To unwise Building Codes—probably not more than 10 per cent.

To labor—stifled production— 6 hours real work for 8 hours pay, and arbitrary rules against economic use of labor and materials (the workingman's own contribution) let us charitably say 25 per cent.

To material, through "Unholy Alliance" between producer, distributor, builders and certain "misleaders" of labor—to put it modestly—25 per cent.

In short, for every $100 worth of home he pays $160; in many instances, of course, a great deal more, but my figures are simply to visualize the situation. And of this surtax of $60 the greater part, let me repeat, is not paid under the written, but the unwritten law. The great bulk of it must be charged to our code of morals.

Yet there are certain sections in many of our building laws that are disgraceful to our intelligence as these dishonest practices are to our morals.

I read recently the interesting statement that the foundations normally placed under a small house would, if properly designed, support 23 houses of the same size. That is a little misleading, because, of course, the writer meant that if you could arrange the 23 houses so as to bring the load down to a point of concentration and meet it with a concrete pillar, you could put 23 houses on a pillar containing no more concrete than that put in the cellar of one of the houses; but it is an illustration of the situation.

I read also a discussion as to whether 6-inch cinder concrete walls cannot be substituted for the 8-inch wall of brick or gravel concrete; also as to whether certain co-efficients and factors of safety could not properly be reduced for special cases.

I might add that, as an illustration of what can be done in economy of material, some years ago I put up 15 or 16 houses with a concrete wall section in which there was 60 per cent. of voids, the inner and outer shells of the sections being but an inch and a half thick.

As to the "Unwritten Laws"—we should have a trade union reformation. We should have membership on the basis of efficiency like the old Guilds. We should substitute leveling up for leveling down, and in place of the slogan "An injury to one is the concern of all," we should put "the benefit of all is the concern of each one." Obviously we should eliminate all rules restricting output in construction.

To sum up. there are a half dozen very obvious things for us to do:

1. Standardize Building Codes throughout the country.
2. Base co-efficients on honest construction and engineering practice.
3. Put the burden of "protecting the public" on the builder—license the building constructor and superintendent.
4. Eliminate the "Unwritten Laws" of waste, limited production and graft.
5. Provide a special section in the building code covering the little house—the laboring man's home.
6. Secure the aid of the Government in scientific research and study for the housing industry.

And in explanation of this last item on the program, let me add that we do not want subsidies from the government to build houses. But on the other hand, we are entitled to the same kind of aid in the housing problem that the Department of Agriculture gives to the farmer. Let us hope that when they organize a Department of Social Welfare or whatever they choose to call it, they will co-ordinate the various useful agencies now functioning in different government bureaus, in such a way that they can all be brought to bear on the problem of home construction. The efforts of this association might well be exerted toward influencing the Government to take that action.

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Doorway, Trinity Church, Newport, Rhode Island

(See reproduction of original drawing by O. R. Eggers on opposite page)

In a preceding issue a general view of Trinity Church was presented. Mr. Eggers' admirably executed sketch of the doorway shown herewith offers excellent suggestions. The quiet dignity of this old church, as it stands surrounded by its graveyard, will impress the visitor.

Trinity was built in 1726, but by whom designed no one has yet been able to discover. In 1762 the church was sawed in two and lengthened so as to about double its original capacity. But so reverently was this church regarded that nothing was done then, or since, to impair the original effect and character of the interior.

This doorway indicates the conscientious attention with which the Colonial builder-architect worked. Its moldings and fluted pilasters show the handmade work that makes a Colonial detail a thing of art and beauty as opposed to the machine cut moldings of the present.

"In their narrow beds, forever laid, the rude forefathers of the hamlet sleep." Their resting place is in the shadow of the church, and the whole locality is one to make for quietness and thoughtfulness.

The two story meeting houses in New England are of unusual interest, and while many of them architecturally present a better result, we doubt if any of our early churches have received more solicitous care or have been more reverently regarded than Trinity at Newport.

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EDITORIAL

More Skilled Workmen for the Building Trades

SENATOR WILLIAM M. CALDER, chairman of the Senate Special Committee on Reconstruction and Production, has recently completed a nation-wide survey of the housing situation of the country. As a result of his investigations he believes that one of the most important problems confronting the construction field today is the matter of securing skilled workmen in the building trades. It is almost commonplace to refer to the demand for building now impending. It would be most unfortunate if that demand were augmented by a lack of skilled workmen after other deterrent factors had been adjusted.

With this in mind, Senator Calder has addressed a letter to the Governor of every State in the Union, urging that steps be taken to establish trade schools in the several states for the purpose of encouraging young men to learn the building trades.

The young American has shown a tendency to ally himself with trades which require a certain amount of skill. Hence we find among the electricians, the plumbers and the masons numerous young men of American birth. This, however, is not the case in the other building trades. These have been left more largely for men from foreign lands, who, dissatisfied with the conditions in their fatherland, have come to this country, and, without training or technical apprenticeship, have started at the foot of the ladder to try for success. The war has cut off this source of supply. Without trained workmen, and in sufficient numbers, the building program will be unnecessarily delayed.

It is therefore reasonable to consider Senator Calder's suggestion to foster building trades schools. Technical training is always useful, and to get it intensively and systematically in a recognized school is equivalent to a large amount of experience.

ANOTHER fact which Senator Calder's committee has revealed is that the supply of labor is depleted through over-specialization. Certain trades, such as paper hanging, have a busy season and a dull, with the result that these trades must be highly paid, or else the men engaged therein must be competent to function in other trades in the off seasons. If apprentices might be trained in trade schools in a sufficiently wide range of related activities to enable them to adjust themselves to changes in industrial conditions and seasonable demands of the construction industry, it would be a direct benefit not only to the tradesmen themselves but to the general public. The constant leaving of affairs to chance is one of the deplorable tendencies of American life. The way in which we chose our professions, or the way in which the humbler trades are entered—arbitrarily and with no thought of the larger needs or the larger results, is shiftless and un-American. When the cry is for skilled workmen for the building trades, the answer must be to train the workmen, and not leave the fulfilment of our enormous building program to accident and the whims of workers.

The American Specification Institute

THAT the subject of specifications is one that receives the serious consideration of architects is evidenced by the many communications received in response to the editorial printed in THE AMERICAN ARCHITECT of November 17, 1920. Excerpts from a few of these have been printed in the issues of December 15-22. Unexpectedly, but not without reason, communications have been received from manufacturers of building materials. These interests are concerned with proper specifications, as they often suffer damage through those improperly written. The owner can also suffer a loss from the same cause. When the specification is capable of human interpretation and execution, the contractor becomes an implement of construction and in a measure an impersonal element. Responsibility is the attribute of the architect alone, as he produces the specification and supervises its fulfillment.

The importance of the person who writes the specification is becoming better appreciated. Anything which will aid him in improving his product should receive the hearty support of all parties to the construction of buildings and other structures.

THE AMERICAN ARCHITECT would presume to suggest to those having in hand the formation of *The American Specification Institute* a consideration of

those organizations that are engaged now in work that is an element of specifications. The very important work of the American Society for Testing Materials very wisely can be left in charge of that organization. In like manner the same applies to the specifications of the American Societies of Illuminating Engineers, Heating and Ventilating Engineers, Mechanical Engineers, Civil Engineers; the American Institutes of Electrical Engineers, Mining and Metallurgical Engineers, The American Concrete Institute, The National Fire Protection Association, The American Railway Engineering Association and others produce very excellent and valuable specifications for construction and the assemblage of materials.

The American Institute of Architects and the independent state and local architectural organizations also have rendered valuable service in adding to specification knowledge and standards.

In fact, a close and intimate relationship between *The American Specification Institute* and all these organizations is essential that it may become the clearing house of their efforts in so far as the writing of specifications is concerned. Having in hand only one thing, it can take the findings of these organizations and reduce them to exact and specific data for actual use. There is no reason why a hearty co-operation should not obtain between them.

The plan and scope of *The American Specification Institute*, which it is understood will soon be ready for general publication, will be studied with interest.

Prices

TODAY'S problem is the price problem.

On page 107 of this issue there appears Part 1 of an important article by Edmund D. Fisher, vice-president of Bank of Detroit. It is "A Study of Prices."

Mr. Fisher shows just what prices are and what affects them. It may seem a trifle curious to a reader of this journal to intimate that it is necessary to have explained to him such a subject, but it is only too true that architects, as well as other business men, are sometimes apt to explain a great many things by that old and time-honored "supply and demand" catchword.

Supply and demand is a real factor, no doubt, but is it thoroughly *understood?*

What Mr. Fisher has to say is fact, based upon fundamental economic principles. To read his article is to understand better the so-called price trend. And what is of more interest and real "dollars and cents" value to the architect at the present moment than that thing which will further help him to gain a better perspective of prices and which will increase his knowledge of the factors necessary to bring about an orderly decline?

Fine Arts in the Government

A SECRETARY of the fine arts has been rumored as a possibility for the Harding Cabinet. The Arts Club of Washington has started a movement to induce Congress to create a Department of the Fine Arts.

Precedent for such an office is furnished by the French cabinet, where the minister of education is also minister of fine arts.

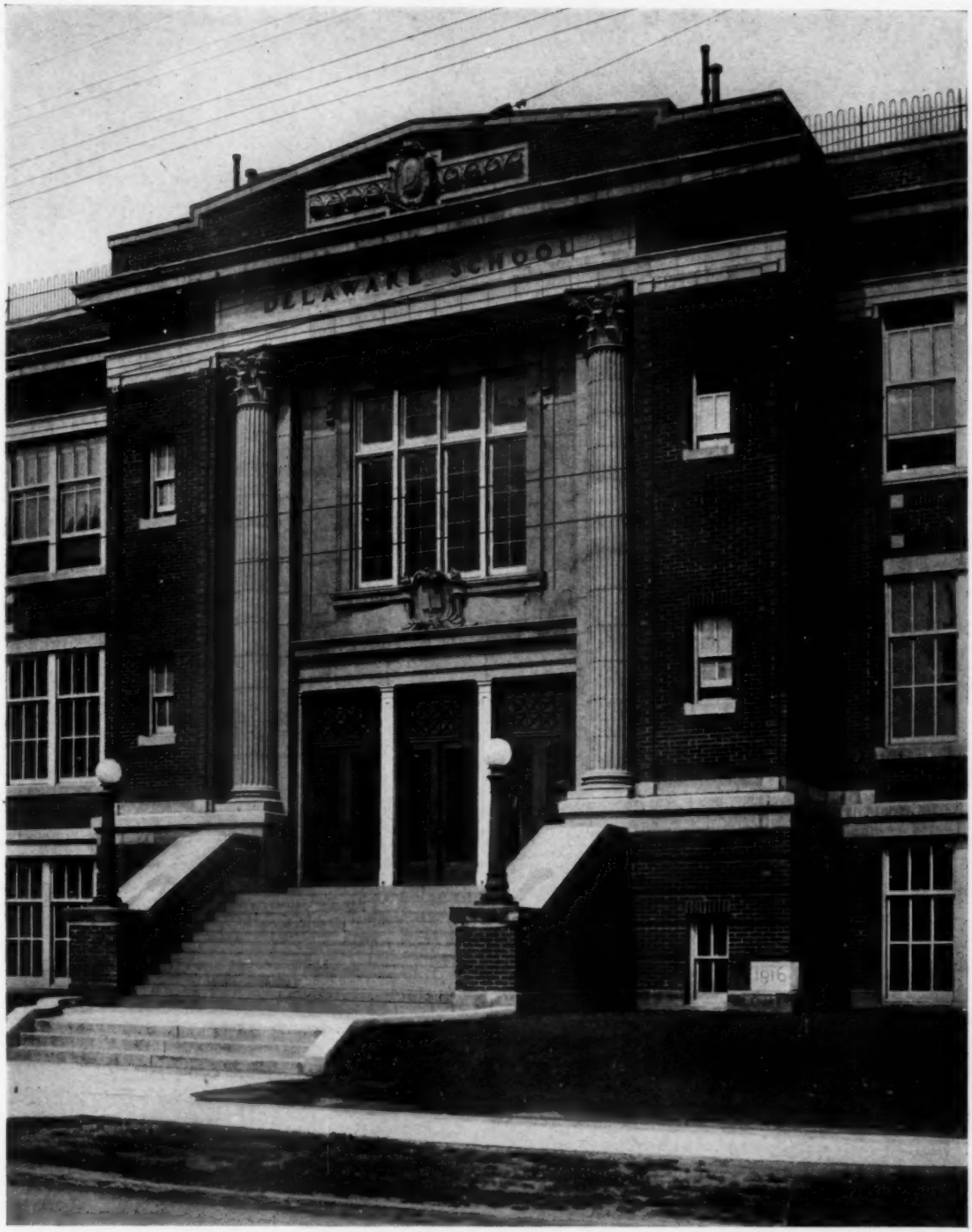
This would involve the establishment by the government of a great national school of music, drama, painting, sculpture, architecture and their allied branches.

That such a school under the protection of the national government would improve art education all over the country is without doubt. Every art school would have to raise its standard of instruction in order to be eligible to become an authorized branch of this great national school.

It would be able to develop an appreciative attitude toward art among those vast groups of the general public where now such an appreciation is almost negligible. By proper educational publicity methods, much good might be accomplished. The numerous organizations now independently furthering the progress of the fine arts could unite their forces and exchange experiences in a manner that would enble each to reach a far larger audience than individual efforts now make possible.

Politicians will undoubtedly raise the objection that this should not come to pass at a time when retrenchment of governmental expense is in progress, especially in view of the fact that we do not even maintain a Secretary of Education. But if it were possible to take that important step it would be fitting, and an augury of hope, if extended official attention were given specifically to the fine arts. The amount of constructive, valuable work that could be accomplished by a competent executive mind would far overbalance the financial outlay.

DELAWARE SCHOOL, SYRACUSE, NEW YORK
JAMES A. RANDALL, *ARCHITECT*



DETAIL OF MAIN ENTRANCE
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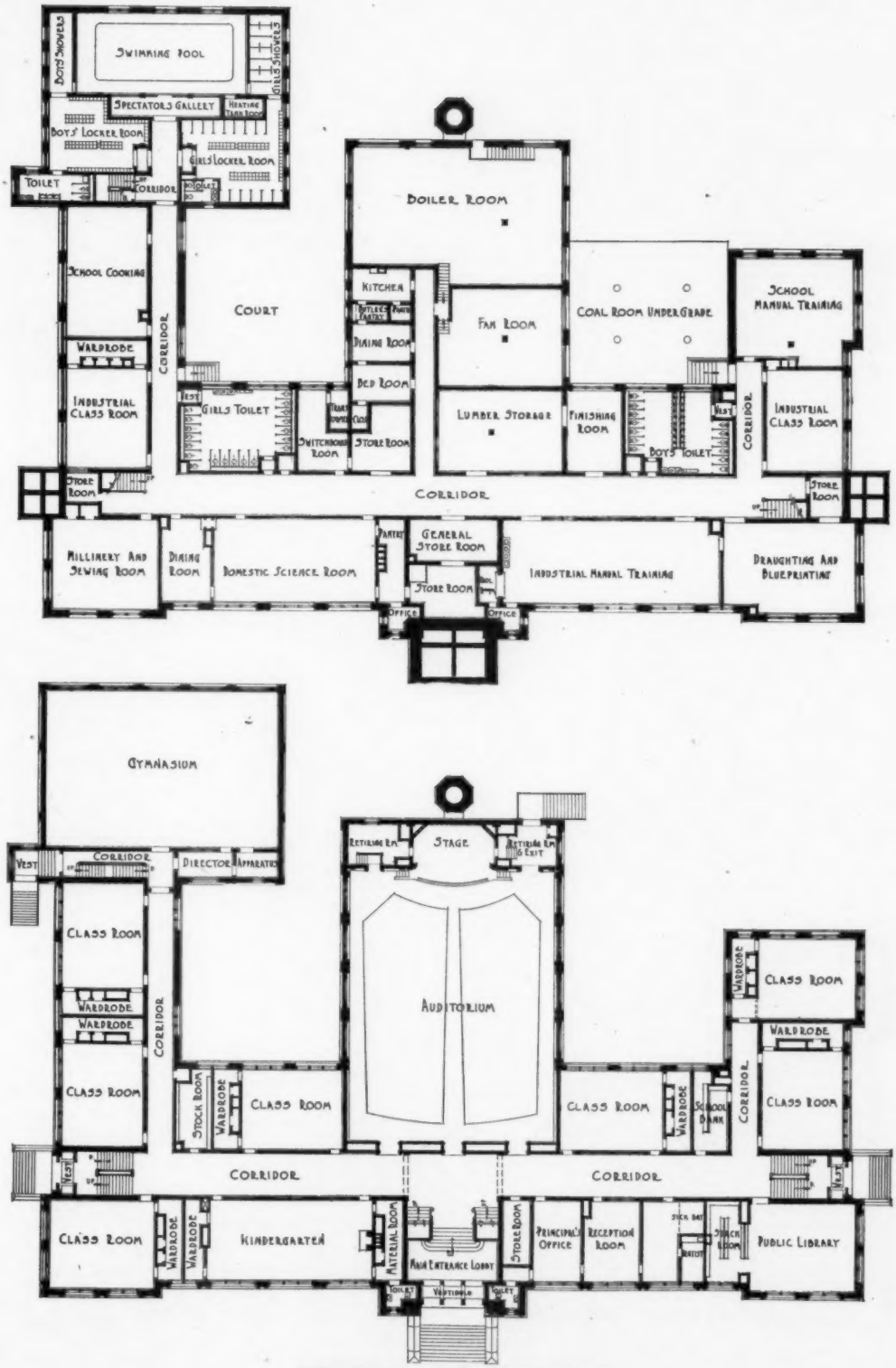

BASEMENT AND FIRST FLOOR PLANS

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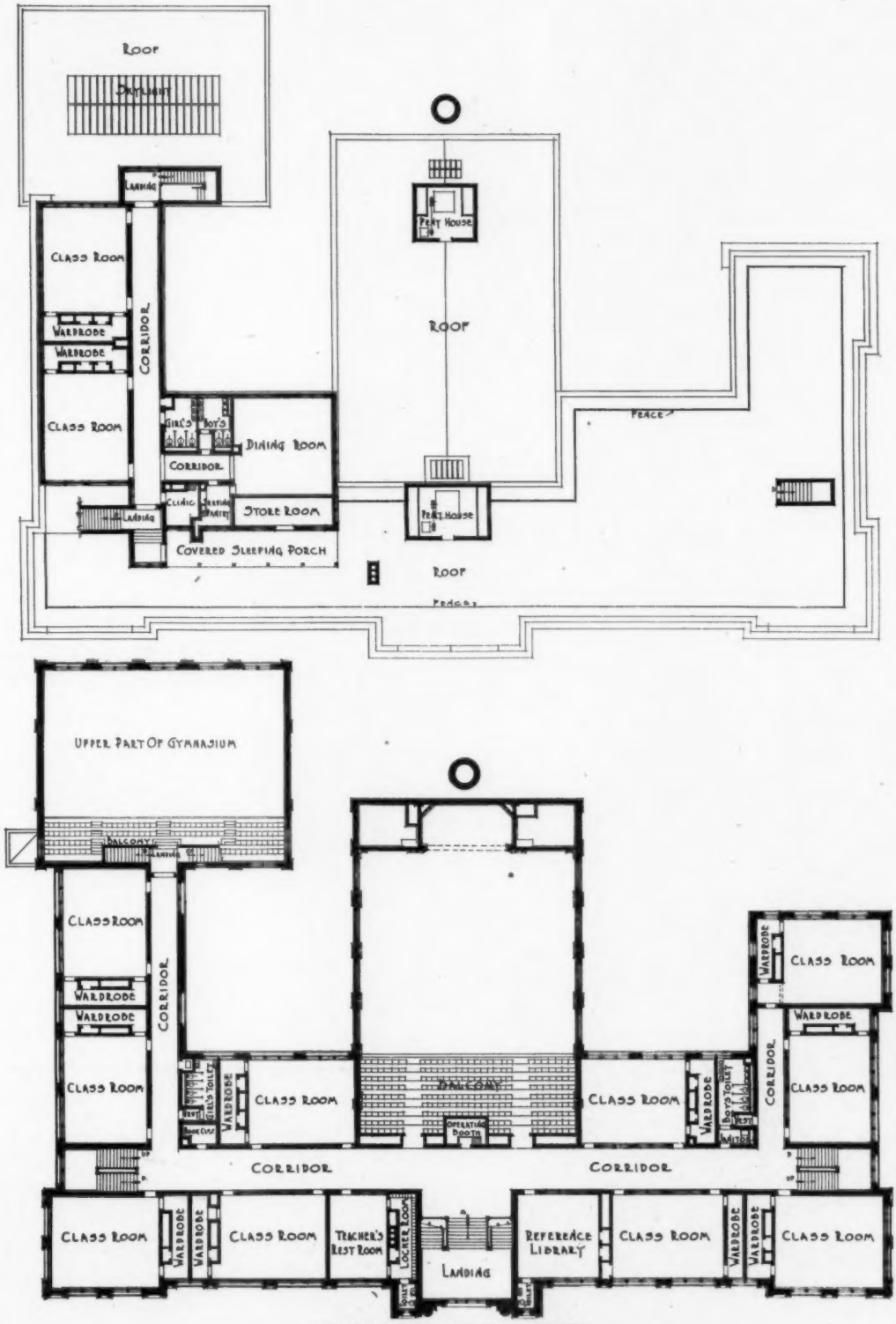

SECOND FLOOR AND ROOF PLANS

DELAWARE SCHOOL, SYRACUSE, NEW YORK

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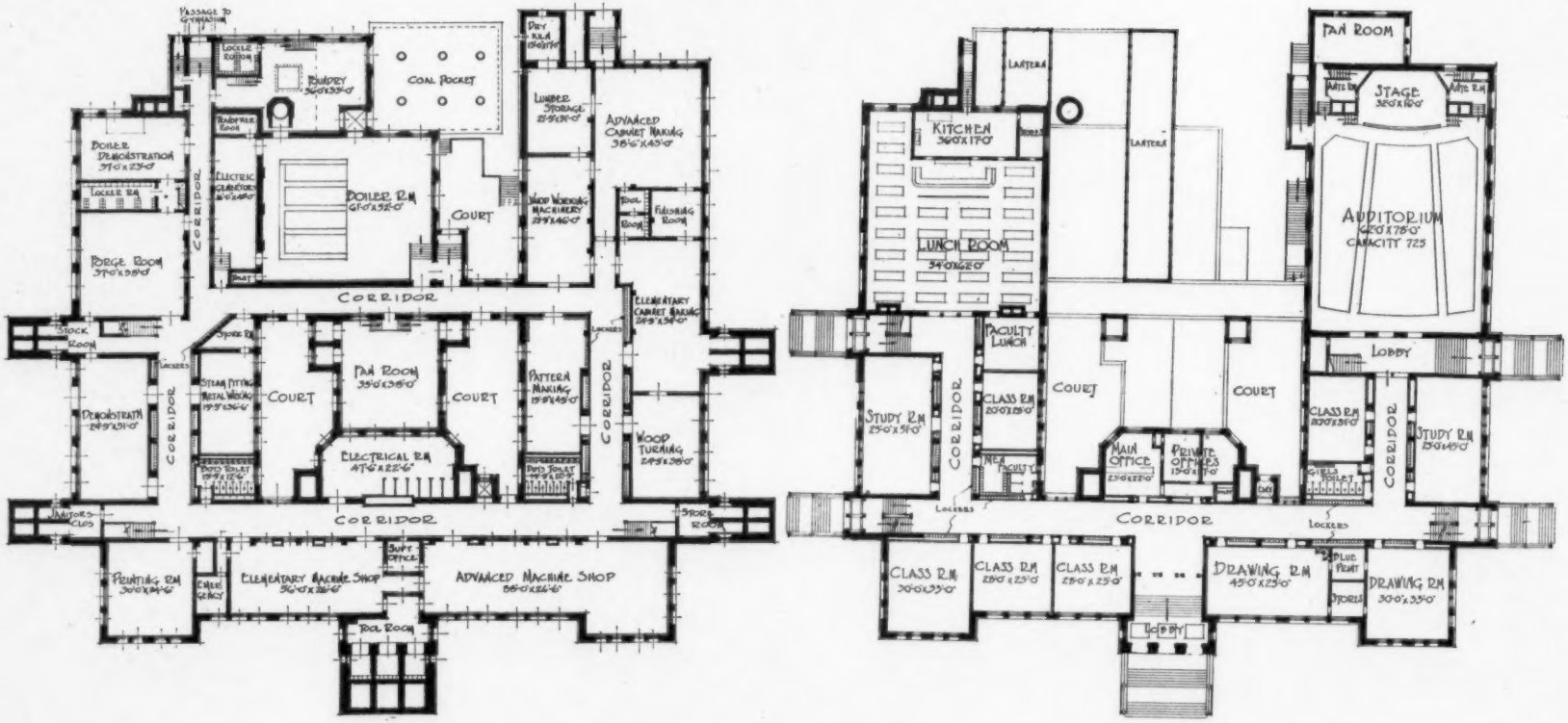
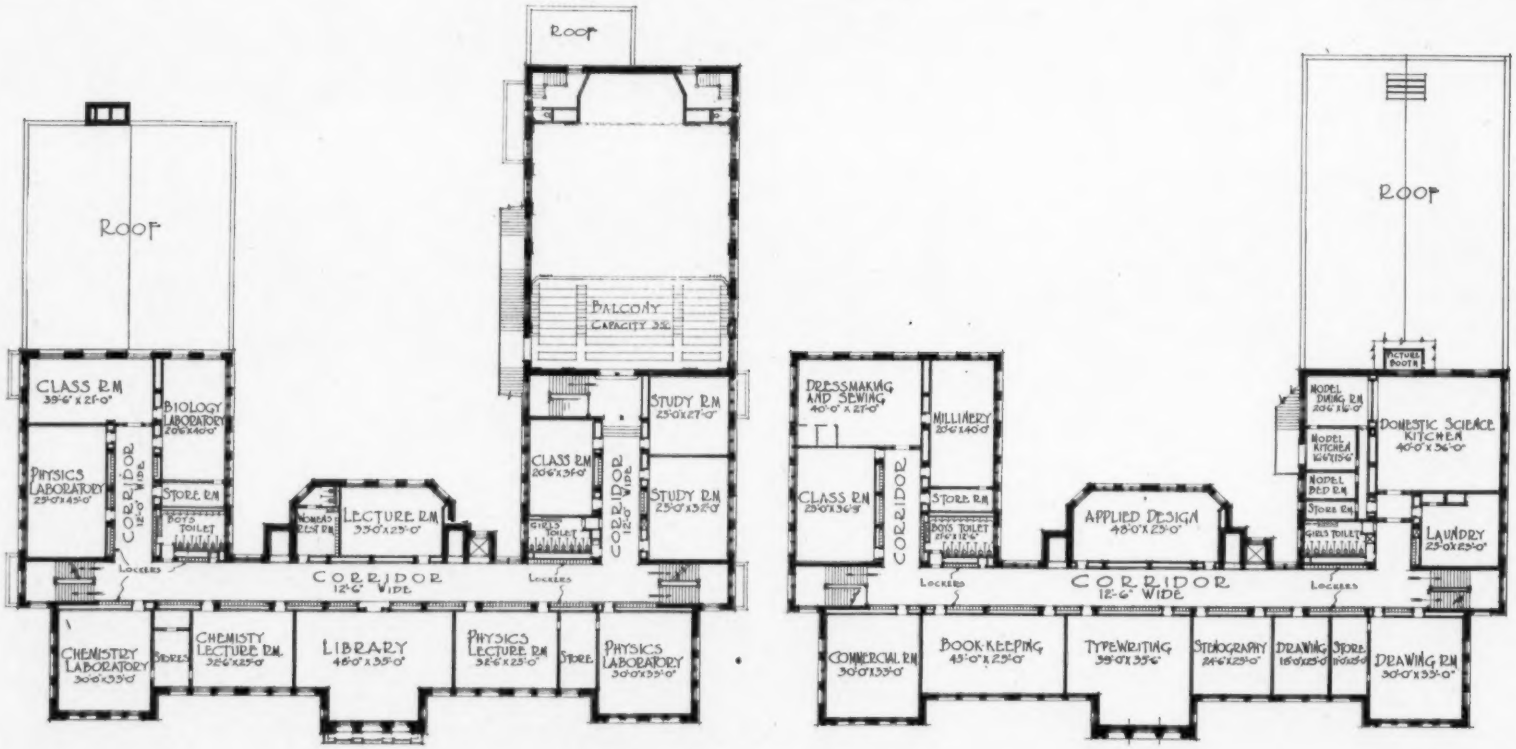
BLODGETT VOCATIONAL HIGH SCHOOL, SYRACUSE, NEW YORK
JAMES A. RANDALL, *ARCHITECT*



BASEMENT AND FIRST FLOOR PLANS

BLODGETT VOCATIONAL HIGH SCHOOL, SYRACUSE, NEW YORK

JAMES A. RANDALL, *ARCHITECT*



SECOND AND THIRD FLOOR PLANS

BLODGETT VOCATIONAL HIGH SCHOOL, SYRACUSE, NEW YORK

JAMES A. RANDALL, *ARCHITECT*

DEPARTMENT OF ARCHITECTURAL ENGINEERING

Heating and Ventilating Industrial Buildings Part III. (*Continued*)

Hot-Blast Systems

By CHARLES L. HUBBARD, *Heating Engineer.*

A TYPE of building frequently used for machine work and similar manufacturing processes is shown in Fig. 1, and is well adapted to hot-blast heating. In small and medium size buildings a single fan and heater unit is placed near the center, and main distributing ducts run in both directions toward the ends. In the case shown, two heating units would be used, one on either side of the central bay, near the center, in order not to interfere with the traveling crane beneath the monitor. The main distributing ducts are run through the roof trusses and branches are brought down on posts to within 5 or 6 feet of the floor and turned so as to discharge at a slight angle toward the outer walls. The galleries are supplied through shorter branches as indicated. The arrangement for a one story building, without galleries, would be the same as shown in Fig. 1, by omitting the upper inlets.

CONDITIONS FOR SUCCESSFUL OPERATION

Arrangements of this kind work well when the horizontal distance from the air inlet to the outer wall is not greater than 20 feet. When the distance exceeds this the air may be blown straight downward from the inlets instead of at an angle and another row of inlets should be ranged along each outer wall or near it. Another way, for a wide building, is to place the warm air inlets as shown in Fig. 1, and carry return ducts along the outer walls with openings near or in the floor. In this way the warm air is drawn over toward the outer walls where it is most needed.

In machine shops, where most of the occupants are actively engaged, a normal temperature of 60 to 65 degrees is considered ample, while the offices and drafting room should be maintained at 68 to 70 degrees in the coldest weather. It often happens that while the lowest continued temperature does not fall below + 10 degrees, or possibly zero, there may be infrequent periods when it falls to — 10 or — 20 degrees. It is usually sufficient in cases of this kind to proportion the heating equipment for zero and take chances on the short duration of colder weather in plants where the men are more or less actively engaged, as in machine shops, foundries, forge shops, etc. For example, a shop designed for a temperature of 60 degrees in zero weather will only fall

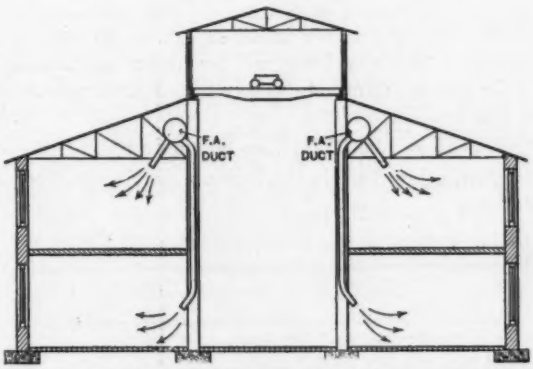


FIG. 1. AN ARRANGEMENT OF DUCTS SUITABLE FOR MONITOR ROOF CONSTRUCTION

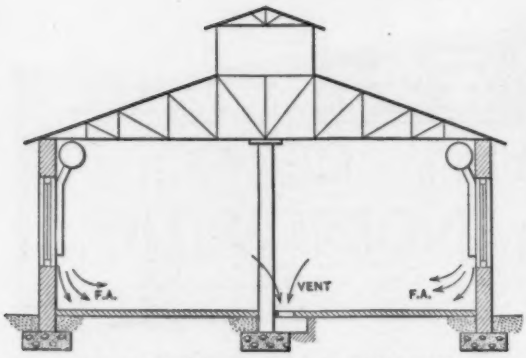


FIG. 2. FOR FOUNDRIES THE ARRANGEMENT OF SUPPLY AND EXHAUST DUCTS HERE SHOWN WILL PRODUCE GOOD RESULTS

to 52 degrees when it is 10 degrees below zero, which will not prove especially uncomfortable in any cases.

The air volume to be supplied in a building of this general type is more commonly based on heating with re-circulated air in zero weather. In cases of this kind the total heat loss by transmission and leakage is first computed for zero outside, and sufficient air circulated to offset this with a temperature range of 80 or 90 degrees.

Example

The total heat loss from a shop is 1,000,000 thermal units per hour in zero weather. The building is to be warmed by recirculating the air, returning it to the heater at 60 degrees and delivering it through the warm air inlets at 60 + 80 = 140 degrees. What volume of air must be moved by the fan per minute to supply the required amount of heat? Here we have

$$H = 1{,}000{,}000;\ T = 80;\ \text{to find V.}$$

Substituting these in the formula previously given we have

$$V = \frac{55 \times 1{,}000{,}000}{80} = 687{,}500 \text{ cubic feet per hour or}$$

$$687{,}500 \div 60 = 11{,}460 \text{ cu. ft. per minute.}$$

When there is an abundance of exhaust steam, or the number of workmen is large compared with the cubic contents of the building, a volume of outside air equal to one to three complete changes per hour should be supplied in the coldest weather, increasing this to 30 or 40 cubic feet per occupant per minute as the outside temperature rises.

Foundries

Foundries contain more or less steam and irritating gases, and are best ventilated by a pair of fans, one for the supply of air and one for its removal. Ventilation by means of skylights or monitor windows, except in warm weather, causes the steam to condense in the presence of the cooler air entering through the windows, thus making conditions worse rather than better. For the best results the air should be admitted and discharged near the floor, as shown in Fig. 2, as this maintains a zone or layer of fresh air in the space occupied by the workmen. Furthermore, the gases which are present are heavier than air and must be drawn off from the lower part of the room. When the work is such that steam and gas are present only in small amounts, the exhaust fan may be shut down; also in warm weather exhaust ventilation may be through the monitor, with a portion, at least, of the fresh air admitted by way of the lower windows. The same gen-

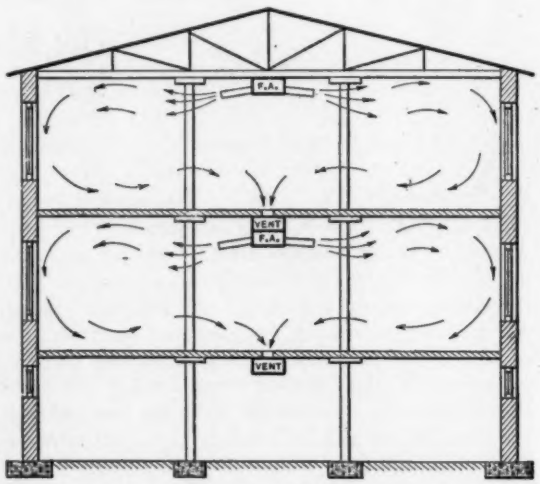


FIG. 4. ANOTHER ARRANGEMENT FOR BUILDINGS SEVERAL STORIES HIGH

Both supply and exhaust ducts are carried on ceilings

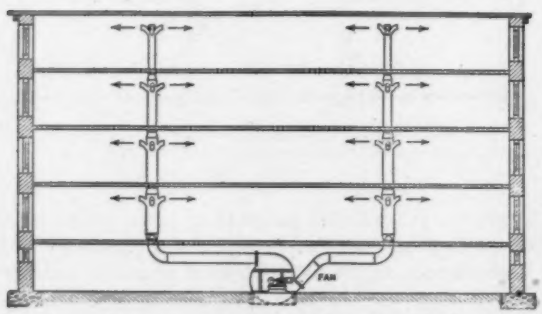


FIG. 3. STAND PIPE SYSTEM OF HEATING AND VENTILATING EMPLOYED IN MULTI-STORY BUILDINGS

eral method of ventilation may be employed for a forge shop.

The equipment for buildings of this kind is usually designed for maintaining a temperature of 50 to 55 degrees in zero weather. Sufficient fresh air should be supplied at all times to keep the building clear of smoke, and may be based on four or five changes per hour for a stratum 10 or 12 feet high, over the entire floor, for iron foundries and forge shops, and twice that amount for brass foundries.

Shoe shops, jewelry factories and buildings of this general type carrying light machinery, are usually several stories in height and require a somewhat different treatment. Two general plans are employed, as shown in Figs. 3 and 4. The first of these is known as the "stand pipe" method, and is adapted to buildings not over 60 feet in width, unless a double row of supply pipes is provided. The vertical flues, or stand pipes, are carried up every 80 to 100 feet and discharge warm air in four directions on each floor. In Fig. 4 fresh air and vent ducts are carried on the ceilings, as shown in the cut, and the warm air discharged downward at an angle of 30 to 40 degrees from the horizontal toward the outer walls. With smooth ceilings and ordinary working velocities, the heat will be evenly distributed by this arrangement for a considerable distance, even up to 100 feet or more, if a return duct is provided at the center for removing the cooler air from the lower part of the room.

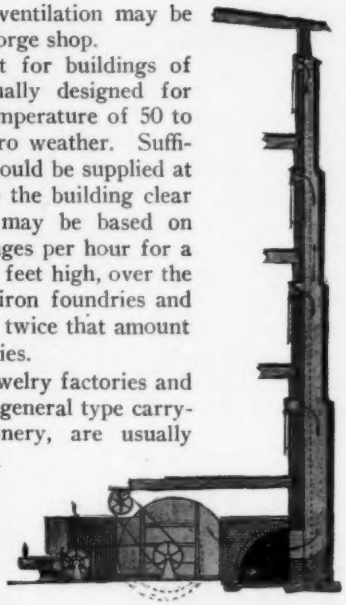


FIG. 5. AN ARRANGEMENT OF AIR SUPPLY DUCT SUITABLE IN TEXTILE MILL

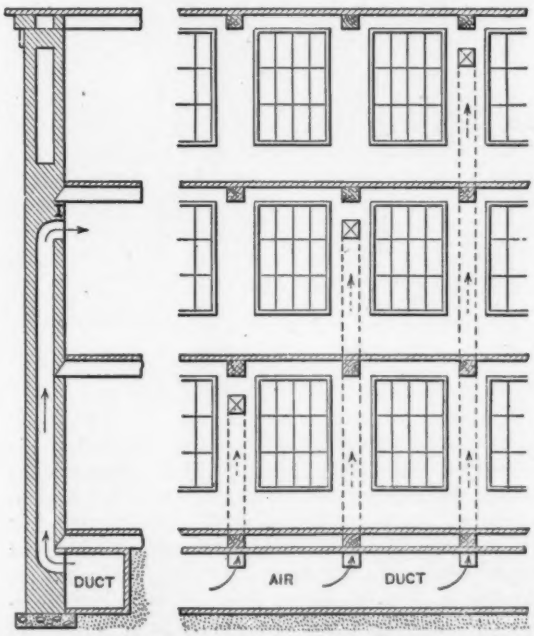


FIG. 6. ANOTHER FLUE ARRANGEMENT ADAPTED TO STANDARD MILL CONSTRUCTION

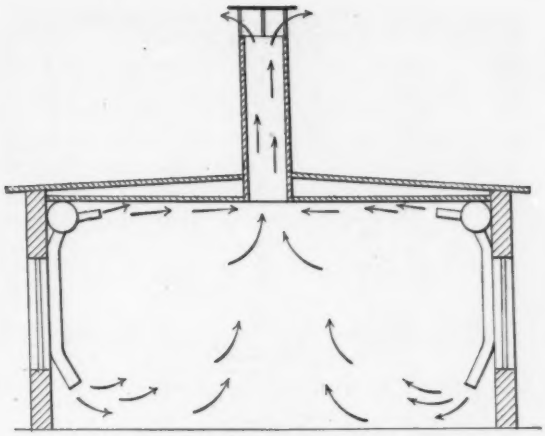


FIG. 7. TYPICAL DUCT ARRANGEMENT FOR DYE HOUSES

Textile Mills

There are two or three standard methods of installing heating and ventilating apparatus in buildings of this general character which may be modified to meet quite a variety of conditions.

One of these is illustrated in Fig. 5, in which case the apparatus is located in the basement and a main supply duct is carried along the outer wall as shown in section in the cut. The uptake flues are of masonry and project from the outside of the wall in order not to encroach upon the space within. The warm air is all delivered at one side of the room and usually *toward* the colder or more exposed wall. The uptakes are spaced from 40 to 70 feet apart and deliver the air to each story through inlets about 8 feet from the floor. The smooth ceilings commonly found in buildings of this kind offer but little obstruction to air flow, and the moving belts and pulleys tend to break up the currents and assist in the distribution. The flue area, as will be noted in the cut, is reduced at each story and the air quantity for each floor is proportioned by an adjustable deflecting damper. Another flue arrangement adapted to standard mill construction is shown in Fig. 6, in which case a sep-

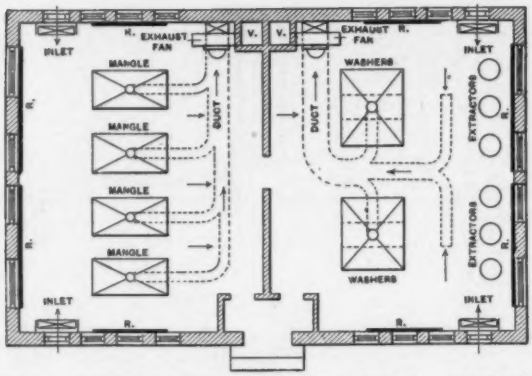


FIG. 8. TYPICAL ARRANGEMENT FOR A LAUNDRY

arate flue is carried from the main air duct through piers between the windows. This has the advantage of avoiding outside pilasters, but increases the number of flues somewhat.

With the piers 12 feet apart, it will be 36 feet between inlets in three-story buildings and 48 feet in those four stories in height.

Textile mills illustrate a class of buildings in which

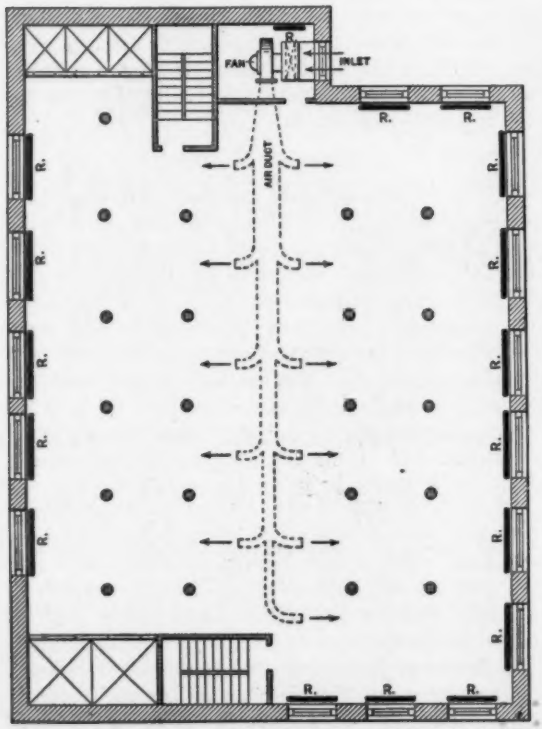


FIG. 9. A SCHEME FREQUENTLY USED IN LOFT BUILDINGS DEVOTED TO LIGHT MANUFACTURING

the humidity of the air must be considered as well as its temperature and volume. In this particular case, if the air becomes dry, frictional electricity is generated by the movement of belts and machinery, and this in turn has a decided effect upon the quality and evenness of the finished goods. This condition may be practically overcome by maintaining a relative humidity of 60 to 70 per cent. at the normal temperatures carried in buildings of this kind. The air may be moistened by means of steam jets or a fine spray of water blown directly into the room when direct heating is employed, or by evaporating pans or air washers in the case of hot-blast heating.

"Air conditioning," which includes the control of humidity is an important branch of engineering, and equipment of this kind should be installed under the

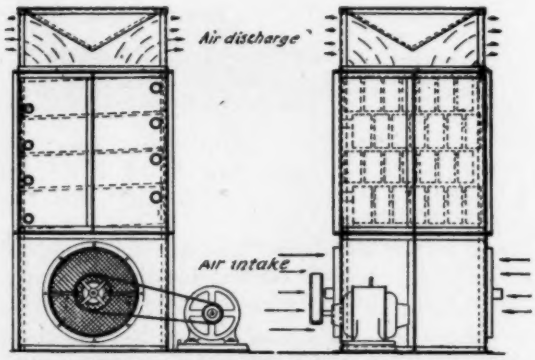


FIG. 10. TYPICAL UNIT HEATER FOR PLACING ON THE FLOOR

direction of a specialist. In connection with the control of humidity, the matter of dust removal must be taken care of not only in certain departments of textile mills, but also in other industries, such as those requiring polishing, grinding, etc. This is best handled by means of a hot-blast heating system, either taking the full air supply from outside or recirculating it through an air washer or wet filter.

Dye Houses and Laundries

In buildings of this kind the special problem is the removal of large quantities of vapor before it has a chance to condense on ceiling and walls. As is well known to those familiar with dye house ventilation, the greatest trouble comes from the condensation of the vapor which is continually rising in clouds from the dye kettles and tubs. When the steam comes in contact with the cool air which is flowing in from doors, windows or roof ventilators it condenses rapidly, sinking toward the floor, and thus obscuring the view. The method of ventilation employed in cases of this kind is to provide a

sufficient volume of warm air to absorb the moisture by evaporation and then exhaust it before it becomes saturated. The volume of air required for this purpose will depend upon the amount of vapor given off, which is at a maximum when the dye is kept at the boiling point and the cloth passed through it from reels located above the vats. It is common practice to provide for a complete change of air every 2 to 10 minutes, according to the processes carried on in the room, once in four minutes being about the average. The best method of admitting and removing the air in cases of this kind will depend somewhat upon circumstances, but in general the greater part should be admitted near the floor at as high a temperature as is possible without overheating the room, and should be removed through openings in the ceiling. When supplied in sufficiently large quantities this air carries the steam with it in a rising current and absorbs a greater part of it at an elevation above the heads of the workmen, thus maintaining a zone of fairly dry and comfortable air in the lower part of the room. In addition to the general supply mentioned above, it is well to

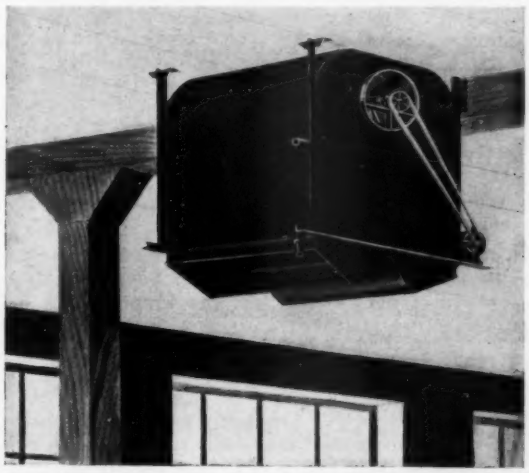


FIG. 11. TYPE OF UNIT HEATER SUSPENDED FROM CEILING

admit a small amount in thin sheets at a comparatively high velocity along the ceiling for driving the steam toward the outlets. A false (hung) ceiling, with air space between it and the roof, is advisable in case of one-story buildings. A typical duct arrangement for a dye house is shown in Fig. 7. While the air should always be supplied by a fan, the discharge may be by gravity when the vent shafts can be carried to a sufficient height to produce the necessary draft. Otherwise an exhaust fan should be employed. The vents should not be more than 20 feet apart, and should be properly insulated and drained to prevent any dripping upon the fabrics in process of manufacture, or upon the workmen.

Laundries, in contrast with dye houses, are apt to become overheated, and as the air contains a high percentage of moisture, the conditions are very enervating to those employed there. While open windows and roof ventilators may answer all purposes in warm weather, the free admission of cold

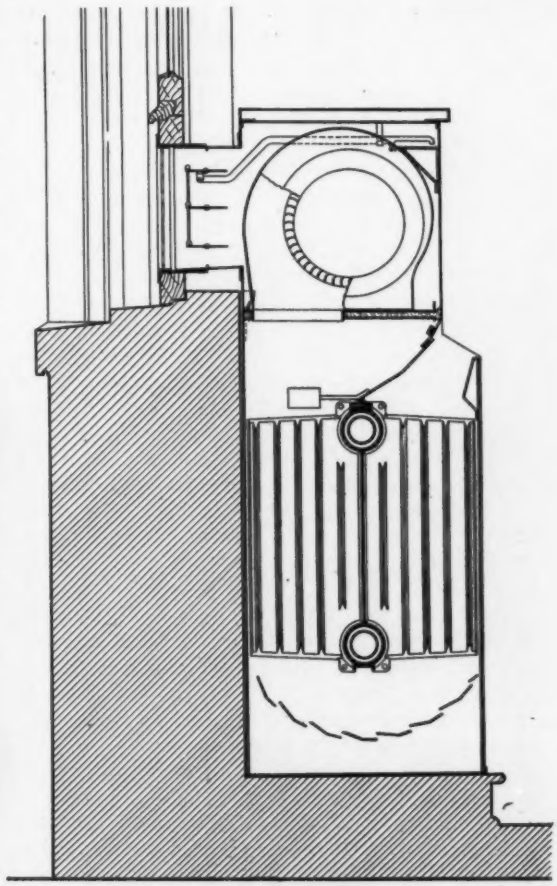


FIG. 12. TYPE OF UNIT HEATER SUITABLE FOR OFFICES, DRAFTING ROOMS, AND SIMILAR OCCUPANCIES

air in winter causes dangerous drafts and excessive condensation. A typical layout for a laundry is shown in Fig. 8, in which the warm air and steam are removed through hoods placed directly over the machines where they are generated. In addition to these are a number of vents near the ceiling for genral room ventilation, all of which, including the

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hoods, connect with ducts leading to an exhaust fan. Fresh air, for replacing that discharged by the fan is admitted through "induction" heaters, which may be either steam coils or sectional cast iron radiators enclosed in galvanized iron casings so arranged that the air will come thoroughly in contact with the heating surface in passing through them.

The rooms are kept warm enough during the night to prevent freezing, either by special direct radiators or by providing dampers of such design that inside air may be re-circulated through the induction heaters when ventilation is not required. In the arrangement shown in Fig. 8 the induction heaters are designed simply for ventilating purposes and all heating is done by direct radiation.

Loft Buildings

Loft buildings are included in a class used principally for mercantile and light manufacturing purposes. The varied character of the work and more or less frequent changing of tenants makes it necessary to install a ventilating system of a semi-portable character rather than a permanent one as in case of a shop or factory. The heating is done by direct radiation, it being customary to place a radiator under each window so that partitions may be shifted at any time to suit tenants without interfering with the heating system. The ventilating scheme generally used is shown in Fig. 9 and consists of fan and heater, made up as a single unit and enclosed in a steel plate casing. This is usually hung from the ceiling so as not to infringe on the floor space. The fresh air is taken from the top of a window and warmed to 70 degrees, then distributed through a ceiling duct, as indicated in the cut. If the space is divided by partitions, then the branches from the main duct should be extended so as to reach each room requiring ventilation. Discharge ventilation is generally accomplished by leakage through windows, stairways, elevator wells, etc.

Unit Heaters

Unit heaters are one of the latest devices to be developed for the heating of industrial buildings and should receive brief mention in closing the present series of articles. A unit heater of this kind consists of motor, fan and heater mounted together as a single self-contained unit. Air is drawn in from the room, passed through the heater, and discharged at a fairly high velocity through specially formed outlets which diffuse it through a considerable space. This air movement produces a more comfortable condition for the workmen than when direct radiation is employed. When used in new buildings a sufficient number of these are installed to produce the required amount of heat, spacing them according to size and heating power. They are especially convenient for additions where it is not practicable to extend the present heating system.

A typical heater for placing on the floor is shown in Fig. 10, and one for suspending from the ceiling in Fig. 11. An outfit of this type adapted to the heating and ventilation of offices and drafting rooms is illustrated in Fig. 12.

(The End.)

Flat Slab Floors

FLAT slab floor construction is fast replacing the beam and girder type of floor, and, generally speaking, has advantages in appearance and economy. However, there will be places where the beam and girder system will show a lower cost. Where panels between columns are square or nearly so, the flat slab usually works to advantage. When columns are spaced unequally or irregularly, it is often more economical to resort to the beam and girder type of floor. If the column spacings may be laid out with economy in view, the square bay and the flat slab will generally be selected. However, this selection should not always be made without a proper check by comparative cost estimates.

Assume, for instance, that a concrete storage building is required, the width of which may be anywhere from 55 to 65 feet and sufficient in length to give a certain specified area of floor space. The design is to be a flat slab system and the building is to be built as economically as possible. The engineer will usually make a design for a flat slab system with the columns spaced at distances he believes will show economical results. Two more flat slab designs should now be made with the column spacings one foot more and one foot less respectively. Comparative costs made on these three designs will show the economical standing of the various spacings for the specified live load.

It will be necessary to make typical cross-section designs showing the column spacings considered and then calculate the comparative costs of each design for a length of building equal to one bay. It is a simple matter to calculate the required length of the building for each type of cross section considered in order that the proper amount of floor space be obtained. The total length of the various buildings should be calculated to the nearest multiple of the length of their respective bays. This being done and the cost of one bay of each type of building being already calculated, the total approximate cost of each type of building is easily found. Adding to these respective estimates the cost of closing in the two extreme ends of the building, the engineer has a very good idea of the comparative costs of the designs he has made.—*Economy in the Design of Reinforced Concrete Buildings.*

How Wrought Iron Is Made

A Novel Campaign for the Education of Laymen. Moving Pictures of the Iron Industry

IN the past it has been customary to regard all galvanized sheet metal as galvanized iron because the old fashioned hand made sheet iron was formerly in great demand for these purposes.

Architects and builders now find it necessary to give special attention to the rust resisting qualities of the sheet metal which they specify for use in ventilating shafts, cornices, leaders and down spouts, tanks and other articles of a similar nature.

If the galvanized sheet metal used is galvanized steel and not galvanized iron, there will be great difference in the service of the product. When modern steel was made to replace the old-fashioned hand made iron it was found that the material did not give the service under certain conditions and its use became a real problem in modern building construction.

For many years metallurgists sought to find why steel would not stand up as well as did the old iron, in meeting the weather and climatic conditions. It was finally proved by these government scientists that the impurities which creep into the steel as made today set up an electrolytic action which cause the metal to pit, flake, and disintegrate in the presence of moisture. The problem then was for a pure iron that would resist rust. How to make this iron pure and at the same time make it in commercial quantities that would keep its price within reason was the big task taken over by the experts of the large steel companies.

Eventually a way was found for making pure ingot iron on a commercial scale that in every respect resembled the old-fashioned iron. In the years that have passed it has measured up to the claims for it in a manner to insure its use when greater permanency in sheet metal construction is desired.

Several views of various stages of the process are shown with this article. These pictures were taken in the plant of the American Rolling Mill Company, Middletown, Ohio. Recently this company has undertaken an educational campaign for the purpose of acquainting manufacturers, engineers and architects with the problems and processes in the manufacture of Armco ingot iron. The making of this iron is interestingly shown in moving pictures which have been made. The "movie" is soon to start on a tour of architectural and engineering societies, technical schools,

LIFTING HEATED INGOT FROM SOAKING PIT

POURING INGOT IRON INTO MOLDS

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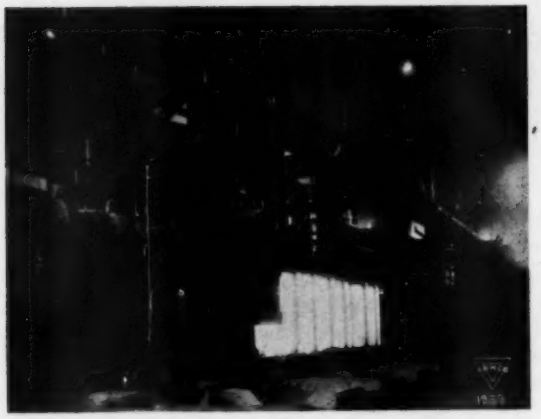

STRIPPING MOLDS FROM THE INGOTS

and sales conventions where the study of results in modern metallurgy is of paramount interest.

Comparatively few laymen have ever seen the sight of metal heated to 3000 degrees Fahrenheit. This temperature is necessary in the making of a pure iron. It is too hot in the vicinity of the boiling metal in the interior of the open hearth furnace for the comfort of most visitors and the intense light from the mass is too blinding for the naked eye. Heretofore it was necessary to look through specially colored glasses at the iron when it was hot enough to flow like water.

When the "Armco" picture was proposed the movie concern was told it had an opportunity to make a record. They said that a close-up scene of boiling iron had never been made. And steel men said it could not be done.

Veteran steel workmen watched intently when the camera man set up his camera, wondering if he would stick it out or if the heat would crack the camera lens or set fire to the explosive film inside. The camera man himself was not sure, but there were two husky men back of him ready to jerk him out of the way in case anything happened.

The result was an entire success. This scene, together with the rest of the 3,000 feet of film is equivalent to a trip through a great steel and iron plant. The film will be shown in all parts of the world and the entire process, from the arrival of the iron ore at the blast furnaces to the final inspection of the finished products, is visualized.

The great value of wrought iron lies in its ability to resist corrosion. While steel gives entire satisfaction for structural shapes, such as I-beams, angles, etc., wrought iron has been found more practical for plain or corrugated sheets and metal lath. The use of wrought iron is almost universal in pipe where its non-corrosive qualities give long life and service.

LOADING SHEETS FOR ANNEALING

ROLLING IRON INTO SHEETS

In the puddling process of manufacture the molten iron is stirred continually until the carbon and other impurities are burned out, leaving the iron in a plastic condition and saturated with slag. The slag is squeezed out before the material is rolled into billets. The slag is present in alternate layers with iron and gives a fibrous structure. These layers of slag form a protective coating against corrosion and serve as a means of easy identification of wrought iron from steel.

Current News

Happenings and Comments in the Field of Architecture and the Allied Arts

Industrial Art at the Museum

The fifth exhibition of industrial art is now in progress at the Metropolitan Museum of Art. It will continue until Jan. 30. The object as heretofore is to show a selected group of objects of current manufacture, the designs of which are based upon sources in the museum. These pieces, brought together from factories and shops, cover a wide range of arts and craft goods, rugs, furniture, textiles, and many others. They serve both to reflect and to stimulate better standards among the layman, and are a further indication of the ever expanding influence of the museum on public taste.

Construction Division of U. S. A. to Hold Reunion

The annual reunion of those who were identified with the Construction Division of the army during the war will be held at the Morrison Hotel, Chicago, on February 25 and 26. The afternoon of the first day will be devoted to business sessions and the annual banquet will be held on the evening of February 26.

The membership of the Construction Division Association consists of those who served in the Construction Division of the army during the war, either in uniform or as civilians. The officers are: President, Col. Clark C. Wright, of George C. Nimmons & Co., 122 South Michigan avenue, Chicago; Vice-President, Col. J. N. Willcutt, of R. D. Willcut & Sons Company, Boston, Mass.; Secretary George Gibbs, Jr., Washington, D. C.; Assistant Secretary, William Kennedy, office of Colonel Evan Shelby, 63 Wall street, New York City, and Treasurer, Major A. C. King, 8 South Dearborn street, Chicago, Ill. Colonel E. C. Stockdale, of Page & Hill, 19 South La Salle street, Chicago, is chairman of the Entertainment Committee.

Philadelphia Architects to Join in Building Exposition

In conjunction with the Philadelphia Real Estate Board's Real Estate and Building Exposition, which will be held at the First Regiment Armory during the week of March 28 to April 2, the T-Square Club and the Philadelphia Chapter of the American Institute of Architects will hold an architectural exhibition, according to an announcement made by Mr. Philip N. Arnold, chairman of the Real Estate Board's Real Estate and Building Exposition committee.

Arrangements for an architectural exhibition are being made by the joint exhibition board of the T-Square Club and the Philadelphia Chapter of the American Institute of Architects, of which George Howe is chairman. This board, in addition to Mr. Howe, consists of R. J. Wadsworth, William C. Stenton, H. Bartol Register, Donald M. Kirkpatrick, Joseph P. Sims and Clarence C. Zantzinger. It is assisted by a special advisory committee consisting of Edward A. Crane, president of the Philadelphia Chapter of the American Institute of Architects; John P. B. Sinkler, city architect Nicola D'Ascenzo, Grant M. Simon, D. Knickerbacker Boyd and Emile G. Perrot.

In addition to the architects there will also be exhibits by the Atlantic City real estate board, the Camden real estate board, the North Philadelphia realty board, the Master Builders' Association and other similar organizations.

The co-operation of the architects, the trades and business organizations and a large list of manufacturers, merchants, material men and others, will make the exposition.

The architectural exhibition, which will be in complete charge of the joint exhibition board of the T-Square Club and the Philadelphia Chapter of the American Institute of Architects, promises to be the largest, most varied and most artistic ever seen in Philadelphia. In addition to holding their own exhibition, the joint exhibition board of the architects also will supervise the artistic features of the main exhibition.

Henry Reinhardt, Art Dealer, Dead

Henry Reinhardt, art dealer, head of Henry Reinhardt & Son, Fifth avenue, New York, died Jan. 13 after a short illness. He was 62 years old and began his art career in Milwaukee when still a youth. In the course of forty-five years he established galleries in New York, Chicago and Paris as well as in his native city.

Among his chief interests was the development of art appreciation in the West, and to this end he

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helped organize several museums; notably the one at Toledo, for which he bought at auction for $20,000 the now famous landscape "Moonlight," by the tragically fated Blakelock. It was Mr. Reinhardt, too, who arranged the loan exhibition of Blakelock's works to raise part of the fund for the painter's maintenance.

Mr. Reinhardt gathered what is said to be the finest collection of the works of George Inness, that which is now in the Art Institute of Chicago. During the war his Paris gallery was given over to the Red Cross for a medical library.

Civic Federation Will Discuss Labor Problems

Outstanding industrial problems, with which the American people are confronted today, from both the national and the international viewpoints, will be discussed at the twenty-first annual meeting of the National Civic Federation to be held at Hotel Astor, New York City, February 14, 15 and 16, 1921.

Kitchen Marathon Two Miles

Preparation of meals for an average family means a two-mile daily kitchen marathon for the housewife, statistics compiled for the conference of vocational workers of the South, in session at Montgomery, Ala., disclosed.

A pedometer attached to students in the kitchen of the model home in Livingstone School showed that measurement for stove-sink-and-pantry route covered during the preparation of the three daily meals.

Vast Forests in Northwest

More than 30,000,000 acres of commercial timber now stands in the private and national forests of Washington and Oregon, according to compilations of Thornton T. Munger, of the district forest service, Portland, recently received by Supervisor William G. Weigle, of the Snoqualmie national forest in Seattle.

What this vast stand of timber means to the Northwest as an economic asset was pointed out by Supervisor Weigle, who estimates that Washington alone cuts between 5,000,000,000 and 6,000,000,000, feet of timber annually. For every thousand feet of timber sawed and finished labor is paid $16, or $16,000,000 in wages for every billion feet.

Of the total area of standing commercial timber in both states, 15,047,000 acres is under private ownership and the remaining 15,428,000 acres under Federal control. This stand of merchanable timber represents 745,000,000,000 feet. The original forest area in both states was 48,000,000 acres, with 4,330,000 acres having been logged off and 7,500,000 acres destroyed by fire. The annual area being cut over at present is estimated at 260,000 acres.

Lumbermen Launch Campaign to Reduce Building Costs

A national campaign to reduce building costs was launched by lumber manufacturers from all sections of the country at a recent meeting in Chicago.

"Lumber has come down in price an average of 30 per cent.," said R. B. Goodman, of Marinette, Wis., chairman of the session. "The lumber industry has absorbed its wartime inflation and we feel that it is up to other building commodities to follow suit. Lumber represents only about 30 per cent. of the cost of the average building and not more than 35 per cent. of the cost of a wooden building."

France Plans Home for Married Women Only

A mothers' home, where women may have the necessary care that they themselves could not afford, is to be established in Bordeaux, France, with funds given by Madame Dutsch de la Muertha. It will be opened only to married women. Buildings, a park of 82 acres and $200,000 were given for the work.

Brooklyn's Plymouth Church Rebuilding

The famous Plymouth Church of Brooklyn, N. Y., which suffered considerable damage from a fire last November, is now being repaired and restored by William Gompert, architect. The work will probably be completed in time for Easter services.

It was to this church that Henry Ward Beecher came as pastor in 1847. In the pulpit of Plymouth Church he acted as auctioneer one Sunday morning in Feb., 1860, and sold a slave girl into freedom. In this building, twenty-eight windows set forth the influence of Puritanism upon the liberties of the Republic. Rev. Newell Dwight Hillis, of international fame, is the present pastor. This is one of the structures that has helped to give Brooklyn a reputation as a city of churches.

Mr. Gompert stated that when the construction is completed the building will be modern in every respect, although it is the aim to retain the original lines and structures as far as possible in order not to interfere with old associations or to mar the sentiment of the old members.

Housing in Germany

In Cassell, a city of 170,000 population, 5,400 persons are without homes, according to the report of

the city housing commission, which is "rationing" rooming houses and hotels in an effort to shelter everybody during the winter months.

Because of the great shortage of houses, due to suspension of building operations during the war, it has been necessary to house large numbers sometimes in a single room. Regardless of ability to pay, the citizens now are compelled to occupy only such room as is absolutely essential and the extra space is apportioned among the homeless.

The "housing problem," while under the jurisdiction of a special commission, really is controlled by the police who keep a record of dwellings and the number of occupants and report their findings to the commission.

Owing to the high price of building material and the labor shortage, unrelieved in spite of the announcement that there is a large, undiminishing number of unemployed, building operations virtually are at a standstill.

Trying to Save Gobelins

Representatives of all the Austrian associations devoted to science and art have protested to Chancellor Mayr against the contemplated pledging of the priceless Gobelin tapestries owned by the Government as security for food supplies. It has been proposed that the tapestries be pledged for $1,000,000 to secure two months' flour rations from the United States.

Steamboat service on the lakes of Upper Austria and in the Salzkammergut region of Upper Austria, Styria and Salzburg were recently suspended because of the excessive overhead expenses.

Rare Rembrandt Stolen

Rembrandt's landscape, "After the Thunderstorm," is stolen from a private owner in Hamburg, Germany. It supposedly was shipped to the United States on board the steamer Mongolia, which sailed the day after the theft.

The painting is on wood. It is sixty-five centimetres in length and forty-nine centimetres high. It is said to be valued at $2,000,000.

For a Bureau of Housing

A bill proposing the creation of a Bureau of Building Construction and Housing in the Department of Commerce has been introduced by Senator Calder of New York on recommendation of the special committee which has been considering reconstruction problems, especially the nation-wide housing situation.

"The bill,' said Senator Calder, "provides for a bureau in the Department of Commerce, which will be a clearing house for all information concerning building construction matters and particularly housing. It is recommended by the leading architects and builders of the country, and it is believed that its operation will bring about a standardization of structural units and material and conservation in general building matters that will be most helpful in cheapening construction."

City Bureau to Plan Homes

In anticipation of a great home-building boom in the spring, the appointment of an architectural bureau is being urged in one of the larger cities according to the Concord (N. H.) Monitor.

It would be the duty of this bureau to consult with prospective builders in any locality and to give whatever aid and advice it could to insure a fine general appearance of the entire neighborhood; to see that building restrictions were complied with, and where former restrictions are not sufficient for present needs, to urge adaptations of plans so that adjacent property need not be harmed by cheapening structures.

Persons interested in establishing the bureau hold that five groups of people are to be considered when a new structure is contemplated. They are:

Those who live in the building.

Those who will live in the neighborhood of the building.

Those who invest their money in the building.

Those who have invested their money in the neighboring buildings or land.

All who see the building or are affected by it day by day.

A committee which co-operated to harmonize all these interests, even though its action be purely advisory, could, with the aid of public opinion, become a valuable adjunct to any community. Its counsel would help to make a city beautiful. Beauty is always a boost to real estate values as well as a source of civic pride, and many of the architectural blunders which result from innumerable individual operations might be avoided in making a harmonious whole.

Important Housing Conference

A housing conference will be held by the National Council of the Chmber of Commerce of the United States at the New Willard Hotel, Washington, January 27 and 28.

The Origin of "Checks"

A few centuries ago, when the ability to read and write was the exclusive property of a very few, the business men of Europe, many of whom could not even write the figures in which they dealt, employed a system of computation something on the principle

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of the Chinese Abacus or counting frame. A checkerboard, it is learned, was placed between the two parties to the transaction and payment was made by matching one row of coins against another. In this way, even if the merchants were unable to count to a sum larger than ten, large transactions could be accurately negotiated by checking the coins, row after row, upon the checkerbord. From this practice accounts between business men came to be known as checks.

This was the origin of the name of the little pieces of paper which today are used, according to the estimate of bankers, in fully 90 per cent. of all business transactions.

News Notes in the Chicago Field

The Chicago city council rent committee is considering a plan for state legislation making residences and apartments public utilities and subject, therefore, to rate rulings of the public utilities commission. The plant was originally suggested by Dean John H. Wigmore of the Northwestern University.

The Bestwall Manufacturing Company, manufacturers of wall-board, is moving its Chicago offices to the main office at Buffalo, New York. The Chicago location was at 332 South Michigan avenue.

The so-called "building trust" inquiry is now going before a federal grand jury in Chicago. The probe relates to the alleged illegal arrangement between manufacturers, contractors and unions to forbid the use of non-union sash and door materials from other cities in Chicago construction.

B. J. Rosenthal, president of the Chicago Housing Association, estimates that 500,000 Chicagoans are poorly, some of them miserably housed.

Efforts to save the Fine Arts Building of the old World Fair group, because of its architectural beauty are not proving very successful. The Illinois Chapter of the American Institute of Architects is preparing an estimate as to the cost of putting the building into condition necessary to its preservation. In the meantime, the use of the building has been given to an American Legion post which proposes to use it as an inside rifle range.

The Woodworkers' Employers' Association has proposed to union carpenters that they accept a wage reduction of 85 cents an hour on the premise that it is better to work all week for 85 cents an hour than two days a week at $1.10 an hour. The unions rejected the suggestion.

Personals

Arthur S. Millinowski and John F. Druar have become associated under the firm name of Druar & Milinowski, consulting engineers, St. Pual, Minn.

Guy A. Carpenter has opened an office for the practice of architecture in the Leggett Building, Fairfield, Ia.

P. J. Rocker, architect, formerly at 15 East 40th street, New York City, has moved his office to 6 East 46th street, that city.

Roger H. Bullard, architect, formerly connected with the firm, Goodwin, Bullard & Woosley, is now practicing on his own account at 15 West 33d street, New York City.

James V. Thetford, architect, formerly of 71 Bremona street, Belleville, N. J., is now practicing at 86 Malone avenue, that city.

Walter Williams, architect, is now located at 301 Fifth avenue, New York City. He was formerly at 420 Madison avenue.

Gregory B. Webb, architect, who was at 104 West 42d street, New York City, is now found at 1358 Broadway, that city.

A. J. Fisher, architect, has moved his office from 4011 North Robey street, Chicago, Ill., to 2001 Greenleaf avenue.

Tilden & Register, architects, have moved from the Franklin Bank Building, Philadelphia, Pa., to 1525 Locust street, that city.

Marchetti & D'Avino, architects, who were formerly located at 756 Main street, Hartford, Conn., are now practicing at Room 58, 721 Main street, Hartford.

Herman D. Roller, architect, has opened an office at 64 East Van Buren street, Chicago, Ill.

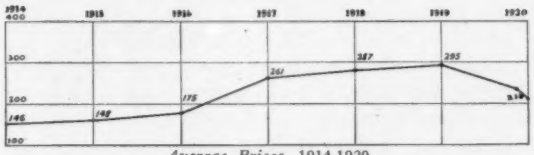
Reilly & Hall have moved from 749 Fifth avenue, New York, to 405 Lexington avenue, New York.

Morrell & Nichols, landscape architects and engineers, are now located at 1200 Second avenue, South, Minneapolis, Minn.

George M. Landsman, architect, has moved his moved his office from the Bowery Bank Building, New York City, to 105 West 40th street, that city.

Weekly Review of the Construction Field

With Reports of Special Correspondents in Regional Centers



Average Prices, 1914-1920
(Note the Swift Decline)

A Study of Prices*

PART I

The Reasons Leading to Advance and What Is Necessary to Bring About Their Orderly Decline; the Manner in Which Prices Affect Credit Conditions

By

EDMUND D. FISHER
VICE-PRESIDENT
BANK OF DETROIT

Editor's Note: Prices are the problem of the day. In our issue of January 19 we stated that an article on "The Architect's Relation to Price Declines" would appear in this issue. The article which follows is an authoritative discussion of the fundamental principles of price advances and declines. It is intended as a basic introduction to "The Architect's Relation to Price Declines," which will appear in an early issue.

AN old school rhetoric gives the following couplet as an example of figurative expression:

"The dashing waves with fury driven
Mount up and wash the face of Heaven."

During a storm at sea the power of the wind makes successive series of waves, the causes of which the observer is usually in no condition to analyze. It is only in the peaceful period that follows the storm that the thoughtful mind might study the subject of wave formation and develop a theory based upon the direct force of the wind in its relation to the reaction from the water, the bottom of the ocean, and the distant shore.

Similarly it is perhaps now possible, with the storm of war subsided and with the experience of a period of inflation and some measure of deflation, to analyze the causes which make the successive waves of price movement which characterize our economic life. It may also be possible to develop some principles of action to stabilize our governmental and business relations in the period of deflation before us.

In studying price relations in order to make the analysis as simple as possible, it may be well to emphasize in advance that, as in the formation of the waves of the ocean, there is a single initial force, the varying power of the wind; so in the price changes of our business life there is also a single initial force, the varying spending power of governments and the people. It will be necessary, therefore, to consider the direct changes in the amount of money and credit used as spending power in relation to a given volume of commodities, and the relative amount so used when the volume of commodities change.

Reference is frequently made to two forces affecting prices—one the buying power (demand), dependent upon the supply of actual money, bank deposits, or the latent power of credit supporting the purchaser; the other the selling power (supply), dependent upon the volume of cmmodities or the amount of service to be sold. Both of these tendencies are, of course, affected by a temporary indisposition to either buy or sell at a given level of prices, as we well know from present conditions.

But as price grows out of a definite relation to the standard of value (gold), it should be considered as the result of a spending power which increases or diminishes directly (increase or decrease of money or credit), or relatively (increase or decrease of commodities), to the volume of trade. Thus, although the standard remains fixed, the value of the dollar in actual use increases or diminishes in relation to its own volume used as a spending power.

The principle to be established, therefore, is that the average level of prices is determined by the amount of money available as spending power. This is effected by the amount of gold in reserve, the volume of credit or currency which the gold supports, and the actual amount of money in the hands of the people. The greater the volume of money or credit, the higher will be the price level, production being relatively the same.

On the other hand, assuming production relatively the same, the reverse is also true—the weaker the spending power, as when money is hoarded or when loans are called or paid, the lower will be the price level. The operation of the principle to which reference has been made is easily lost sight of in the history of business experience, because, although spending power is the dominant factor, it is frequently confused with what are seemingly new conditions, such as war and the variations in production and selling power.

THE entire subject may, perhaps, be better understood by a study of the following analysis:

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INFLATION

COMMODITIES	MONEY	PRICES
Stated volume of commodities at prices then fixed	If money or credit increases	Prices go up
Reduced volume of commodities	Amount of money or credit then relatively increases	Prices go up
Increased demand reducing commodities	Amount of money or credit then relatively increases.	Prices go up

During such a movement as the foregoing, as prices go up, the amount of credit and currency also directly, as well as relatively, increases, made necessary by the growing dollar amount of goods to be moved, until restrained by diminishing gold reserves or bank policy, impelled by increasing rediscount rates.

DEFLATION

COMMODITIES	MONEY	PRICES
Stated volume of commodities at prices then fixed	If money or credit decreases	Prices go off
Increased volume of commodities	Amount of money or credit then relatively decreases	Prices go off
Reduced demand, relatively increasing commodities	Amount of money or credit then relatively decreases	Prices go off

During such a movement, as prices go off, the amount of credit and currency, directly as well as relatively, decreases, made possible by the lessening dollar amount of goods to be moved, until stimulated by increased gold reserves and a more liberal bank policy, impelled by lowering rediscount rates.

A PERIOD of inflation and deflation may be pictured as a definite wave of price movement; but like the ocean, there are short waves and long waves. The price waves range from the movements that grow out of the day to day fluctuations of the market to the long "ground swell" that seems to us extends over a long period of years. These movements are all operating constantly, are complexly interrelated, and grow out of the variations of spending power with the reactions from variations in production and demand. A disintegration of these movements, however, would seem to develop a fairly comprehensive classification, eliminating all temporary and superficial day to day price changes.

PRICE CHANGES

Seasonal Movement:	Reactions from seasonal variations in production and demand.
Anuual Movement:	Reactions from variations in annual production.
Credit Movement:	Direct result of varying amounts of bank credit and currency.
Gold Movement:	Direct result of variations of world gold production.

Seasonal variations in prices are, of course, familiar to the business and buying world. Business men are also vitally interested in the statistics of annual production, as the increase or decrease of the principal crops in the reaction on spending power frequently makes important, though temporary price changes.

The credit movement is a short period swing in prices. Without direct relation to the increase or decrease of gold, a spending power develops and recedes through the expansion and contraction of credit and currency. Beginning at a period when bank reserves are high and money is "easy," a growing business activity in all lines fosters a growth of loans made on both a sound and unsound economic basis. While individual loans made in such a period of expansion may be perfectly good from the standpoint of ultimate payment, the composite influence of many loans that are not self-liquidating, such as mortgages, loans on stocks and bonds, and government securities, merely adds to the spending power of the period and directly operates to increase prices. The higher level of prices thus established necessarily increases the dollar volume needed to conduct future trade, and so an endless chain of increased loans and higher prices is established. The emergency brake is finally jammed on, and the financial gears thrown into reverse, and there occurs the liquidation of loans and the reduction of currency, with the consequent diminishment of spending power.

The gold movement, a long swing period in prices, is usually very sluggish, and is characterized by the basic variations in spending power caused by the economic effect of variations in gold production. As gold is the basis of bank reserves and currency issues, its gradual change in volume has an ultimate under-current effect upon all price movements.

(To be continued.)

(Special Correspondence to AMERICAN ARCHITECT*)*

SEATTLE.—Jobbers of the Pacific Coast territory report that the outside steel mills have horizontally met the Corporation price and are trying to convince the retail and investment construction trade that rock-bottom has been struck for the season and that a delay in placements beyond May 1 will mean higher prices for them. Stocks on hand are now well balanced. The overstock is sufficient

to meet any sudden movement in early spring months.

The feeling toward building for 1921 is changing rapidly. Optimism has replaced the pessimism of December, and there is increasing evidence of confidence among investors and builders. Architects report that builders are now convinced that the "holding off" policy for lower prices is now futile. Building labor is producing at normal per capita, new projects are slowly being released, the lumber market has undoubtedly struck bottom (as shown in the stationary bottom for the past two weeks), mills are resuming operations, and labor costs have been reduced.

Wholesale and jobbing interests are co-operating in the tail-end liquidation, now believed to be well over. Minor reductions in building hardware during the week are putting the finishing touches on the orderly process. Larger operators believe steel will sustain itself, in view of demand and fair gross margins instituted by the mills after the war.

Representatives of eastern roofing who sent out flunkeys with order books during the war to look over the territory and book orders merely because the demand far exceeded the supply are to come in for castigation by jobbers. The houses which took unfair advantage during the war are in process of elimination from the territory.

Roofing prices are now on the past four months' levels. There is an oversupply, and liberal offerings. Three cement plants are now in full operation after two had been closed wholly or in part for six months. One attended to the export production, one closed entirely, and the third was on half time. This represents the total cement production, normally heavy, in the North Pacific territory.

Average prices received at the fir mills during the week at the mill were $59 to $54 for vertical grain flooring, $29 for No. 2 slash grain flooring, $51 for finish, $25 to $28 for ceiling, $31 for drop siding, $15 to $20 for boards and shiplap based on sizes, $23.50 to $14.50 for dimension, $19.50 to $21.50 for plank and small timbers, and 26 for big timbers. The fir log market declined this week from $18, $24 and $32 to $12, $14 and $20, and wages in the fir mills and logging camps are down 25 per cent., with no remonstrance from the men due to the unemployment situation.

Red cedar shingles are steady on a speculative rather than an order basis, and stocks on hand in British Columbia, Washington and Oregon, the scene of production, are under normal at 500,000,000 shingles, exclusive of transits and held for disposal at reconsigning points. Manufacturers are refusing to sell on the present price to the trade of $1.85 to $1.95 for stars and $2.00 to $2.10 for clears, 20-20 or "square" pack basis, which has superseded the old per 1,000 basis.

Seattle's building record for 1920 fell little short of that of 1919 according to the figures of the city building department. With the issuance of the permit for the 10-story Class A structure now in the last steel stages by the Pacific Telephone and Telegraph Company the total for the year was brought up to $13,500,000, as against $15,000,000 for 1919.

The contract for construction of the nurses' building at the Puget Sound navy yard, Bremerton (17 miles from Seattle), was let to Swennson & Co., contractors, of Seattle.

(*Special Correspondence to* AMERICAN ARCHITECT)

CHICAGO.—The building public here is indulging in a "buyers' strike" and is waiting for the actual materialization of the now famous rock-bottom basis. The endless circle of cause and effect—lumbermen blaming materials men, materials men blaming labor, and labor blaming the high cost of living—is blocking building here for a while, at least. When this is disposed of, and actual materialization of rock-bottom prices comes into existence, there is no doubt that building will go forward in Chicago in a manner never before witnessed.

The principal hope for this stabilization of the condition lies in the conference of all the varied industries in the building trades, which will take place here January 21-22 and in which keen interest is shown on every hand. President-elect Harding has written John H. Kirby, president of the National Lumber Manufacturers' Association, recalling the recent visit made to him by officials of the association and expressing the hope that the conference will result in a plan which will serve to revive building and lessen unemployment. Mr. Harding also points out that this conference may very well inspire other lines of industry to do likewise.

Labor is contributing its share to readjustment a trifle more readily than in the past. Far-seeing labor leaders are encouraging labor leaders to bear some of the shock of the readjustment period. Unemployment is unconsciously helping in this, but there is distinctly a tendency toward more active participation, a "day's work for a day's pay" now coming more generally into favor. Wages remain upon about the same levels, though longer working days are announced by several firms, notably the Pullman Company, the nine-hour schedule having been established in some of the construction departments, over the protest of the employes. This affects two thousand men in Chicago, and possibly some in the Pullman works in Buffalo and Wilmington, Delaware.

Unemployment here has been exaggerated by va-

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rious sources, some putting the number of unemployment at 200,000. But George H. Burns, in charge of the Chicago District of the Department of Labor, maintains that his figures show about 90,000 men out of work in this district.

Excellent progress is reported in connection with the new union station. It is intended now to complete the building in two years. The completed building, trackage and the like will cost about $60,000,000.

The Wrigley building, which for a time at least is to be Chicago's most conspicuous office building, is now almost ready for tenants.

Plans are under way for a new $1,500,000 building in the so-called "Link District," which is an extension of Upper Michigan Avenue. The building will be twelve stories, at Erie Street and Michigan Avenue, will contain shops of the smarter sort on the ground floor, and will be one of the units designed to cause New Yorkers to grow green with envy when they contemplate the beauties of the upper reaches of aristocratic Michigan Boulevard.

Chicago is to have a million-dollar temple to Bahai, if present plans mature. It will be an architectural novelty, situated on an eight-acre tract in Wilmette, an exclusive North Shore suburb, will be 160 feet high, with a round base 160 feet in diameter. There will be nine sides, with a door in each side, typifying the doors by which the devotees of the nine principal faiths may enter the temple and the faith of Bahai. Henry J. Burth, of Holabird & Roche, architects, is structural engineer for the temple. Application has been made for a building permit.

Costs of lumber and other building materials have undergone no recent change of importance. Present Chicago quotations are:

Yellow Pine: B. & B. 1-in., $95 to $130, depending on thickness; 2 x 4, No. 1, 10 to 16 ft. length, $51 to $53; 2 x 6, $48; 2 x 8, $50; 2 x 10, $53; 2 x 12, $55; 13-16 x 3¼ z & b flat flooring, $85 to $90; 1 x 6, No. 2 common, $48 to $90. *Douglas Fir:* 2 4 S, in sizes up to 12 x 12, in length up to 32 ft., $65 to $70; 14 x 14, $68 to $73; 16 x 16, $72 to $75; 18 x 18, $75 to $80. *Hard Maple:* Four, ¼ No. 1 and 2, $135; select, $120; No. 1 common, $100; No. 2 common, $65; No. 3 common, $32. *Birch:* Four ¼ No. 1 and 2, $160; select, $133 to $138; No. 1 common, $95 to $100; No. 2 common, $60 to $65; No. 3 common, $40. *Red Gum:* Four ¼ No. 1 and 2, $150; No. 1 common, $90 to $92; No. 2 common, $45.

Face Brick—Standard, vitrified red, $32.00@34.00; Smooth, Indiana red, $38.00@40.00; Smooth Ohio red, $38.00@40.00; Smooth, Pennsylvania red, $46.00@48.00; Smooth, buff, $45.00@47.00; Smooth, gray, $47.00@49.00; Rough, buff, $44.00@46.00; Rough, gray, $47.00@49.00; Variegated, rough texture, $34.00@49.00.

Common brick, $16.00 per M. Portland cement, $3.00 per bbl. Torpedo—Lake and bank sand, $3.50 per yd. Crushed stone, gravel screenings, $3.50 per yd. Hydrated lime, Ohio, paper, $22.00 per ton. Hydrated lime, Ohio, cloth, $29.00 per ton. (Includes sacks at 30c. each.) Hydrated lime, Wis. paper, $20.00 per ton. Bulk lime, $1.75 per ton.

(*Special Correspondence to* AMERICAN ARCHITECT)

BOSTON.—The optimistic tone noted at the beginning of the new year was justified in a great many instances, but there is still much ground to be recovered.

The opening of many of the larger textile mills, a better sentiment in the woolen market in Boston, a return of confidence in the shoe and leather industries, all point to better things. Shoe sales amounting to $10,000,000 during the recent National Shoe Retailers' Association in Milwaukee indicate the beginning of the end of the so-called "retailers' strike" which curtailed buying for a long period.

One cloud in the bright building outlook in New England loomed up recently, when the United Building Trades Council of Boston, representing about 30,000 building mechanics, voted to reject the proposed 90-cent per hour agreement offered by the Building Trades Employers' Association, a cut of ten cents an hour from the old agreement. Contractors interviewed by your correspondent see little to worry about in the situation, considering the move ill-timed just now, when there exists a large excess of workers, due to scarcity of building projects. General opinion looks for a satisfactory settlement of the matter before spring building starts.

Your correspondent finds that contracts awarded for the week ending January 11 would appear to indicate a typical situation. For 1920, for that week, contracts awarded amounted to $2,175,000 as compared to $5,145,000 for the corresponding period in 1920; $722,000 for 1919; $2,602,000 for 1918; $2,048,000 for 1917, and $3,248,000 for 1916.

THE CATHEDRAL, MAINZ, GERMANY